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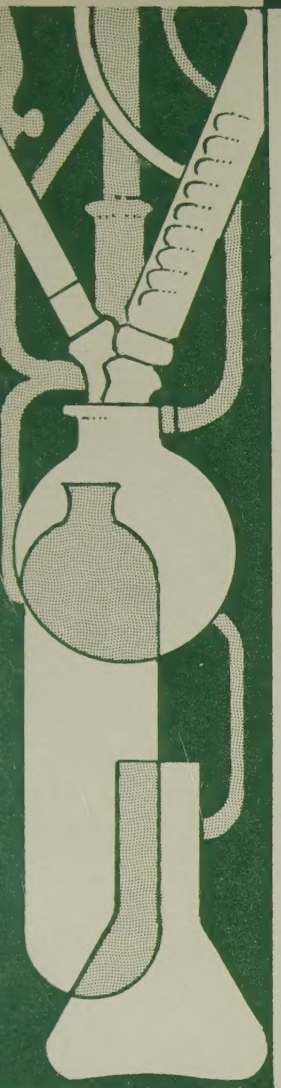

COMMERCIAL FISHERIES ABSTRACTS

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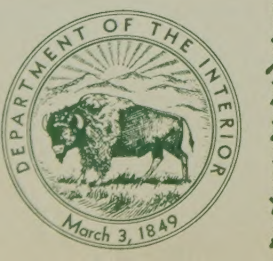

UNITED STATES DEPARTMENT OF THE INTERIOR
Walter J. Hickel, *Secretary*
Fred J. Russell, *Under Secretary*
Leslie L. Glasgow, *Assistant Secretary for Fish and Wildlife and Parks*

U.S. FISH AND WILDLIFE SERVICE
Charles H. Meacham, *Commissioner*

BUREAU OF COMMERCIAL FISHERIES
Philip M. Roedel, *Director*

FOREWORD

The Department of the Interior's Bureau of Commercial Fisheries publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

Commercial Fisheries Abstracts contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.

Leslie L. Glasgow
Assistant Secretary for Fish and
Wildlife and Parks

0.38 ENZYMES ACTIVATED BY MONOVALENT CATIONS

Suelter, C. H. (Department of Biochemistry, Michigan State University, East Lansing)
Science 168, No. 3933, 789-795 (May 15, 1970)

The author examined the literature treating reactions catalyzed by enzymes that are activated by monovalent cations. The data pointed to a unique interaction of monovalent cation with the substrate and enzyme to form a functional ternary complex whose singularity, the author found, has not as yet been defined. However, he was able to elaborate a characteristic pattern for the reactions that are activated by monovalent cations. (1) Phosphorylation of a carboxyl group or enolate anion, (2) eliminations resulting in an enol-keto tautomer, and (3) reactions in which an enol-keto tautomer or a potential enol-keto tautometer is a logical intermediate in the sequence of events between reactants and products are all suitable for such activation. [13 figures, 1 table, 120 references]

0.4 (0.7) NITRITE TOXICOSIS IN THE ASCORBIC ACID-DEFICIENT GUINEA PIG

Kociba, Richard J., and Stuart D. Sleight (Department of Pathology, Michigan State University, East Lansing 48823)
Toxicology and Applied Pharmacology 16, No. 2, 424-429 (March 1970)

The use of food containing nitrate and nitrite compounds has increased. Improperly processed meat products and vegetables and certain well waters may contain toxic levels of nitrate and nitrite compounds. In nitrite toxicosis, the hemoglobin of the blood is converted to methemoglobin. Nitrate must be reduced to nitrite before it can cause the formation of excess levels of methemoglobin. Previous work by Sleight and Atallah (1968) demonstrated reproductive disturbances (abortion, fetal absorption, and mummification) in female quinea pigs treated with potassium nitrate and potassium nitrite. To properly evaluate the potential health hazards of nitrite compounds, various other factors that modify the susceptibility to nitrite toxicosis, such as the nutritional status of the body, must be considered.

The present study was carried out to determine the effects of nitrite toxicosis in guinea pigs during a nutritional deficiency of ascorbic acid. Special emphasis was placed on the pregnant animal (where nutritional deficiencies are more common). The guinea pig was selected because of its similarity to man; both species depend upon dietary ascorbic acid.

Subcutaneous administration of 50 mg./kg. $NaNO_2$ produced significantly higher

(over)

0.5 (3.15) CHANGES IN RESISTANCE TO RADIATION AND HEAT DURING SPORULATION AND GERMINATION OF CLOSTRIDIUM BOTULINUM 33A

Durban, E., R. Goodnow, and N. Grecz (Biology Department, Illinois Institute of Technology, Chicago, Illinois 60616)
Journal of Bacteriology 102, No. 2, 590-592 (May 1970)

Mature bacterial spores are more resistant to heat, ultraviolet radiation, and gamma radiation than their parent vegetative cells are. Because the resistance to various physical and chemical stresses do not depend on the same mechanism(s), the ability of the organism may appear or disappear at different stages of sporulation or germination in the metamorphic cycle. The purpose of the present study was to determine the sequence of appearance of the various types of resistance during sporulation and germination of Clostridium botulinum 33A.

During the sporulating cycle, C. botulinum 33A developed resistance to ultraviolet and gamma rays about 2 hours prior to its development of heat resistance. During the germination cycle, the cells showed loss of resistance to heat, ultraviolet radiation, and gamma radiation simultaneously.
[2 figures, 8 references]

0.6 (9.6) DIE GRUNDLAGEN DER VERFAHRENSTECHNIK IN DER LEBENSMITTELINDUSTRIE [THE FUNDAMENTALS OF PROCESSING TECHNIQUES IN THE FOOD INDUSTRY]

Loncin, M.
Verlag H. R. Sauerländer & Co. Aarau, Frankfurt am Main, Germany (1969), 976 pp. Price: SFr. 120.
Reviewed by Yeshayahu Pomeranz
Food Technology 24, No. 5, 74 (May 1970)

The reviewer states that this is an excellent, comprehensive, and advanced treatment of the subject. It is part of a series on Fundamentals of Chemical Technology published under the auspices of the European Federation of Chemical Engineering. The book contains 12 chapters and deals with two main aspects of food technology: (1) processing (mixing and separation, and modification by chemical, enzymatic, and microbiological methods) and (2) commercial sterilization. The reviewer recommends this book to students, teachers, scientists, technologists, and engineers interested in understanding and improving existing processes of food manufacture and in pursuing the best methods for developing new products.

0.4

levels of methemoglobin in ascorbic acid-deficient guinea pigs than in the control animals. The dosage was fatal to a high percentage of the ascorbic acid-deficient group, but all the control group of guinea pigs survived.

Pregnant guinea pigs with plasma ascorbic acid level below 0.40 mg./100 ml. aborted following the injection of 45 mg./kg. of $NaNO_2$. Apparently a subnormal level of ascorbic acid in the plasma is associated with an increased susceptibility to toxicity from $NaNO_2$ in the pregnant guinea pig.

The data further indicated that fetal deaths were related to higher levels of methemoglobin in the maternal blood of the ascorbic acid-deficient guinea pigs. [2 figures, 2 tables, 5 references]

0.4 (1.9) HISTOCHEMICAL STUDIES OF THE MUCUS ON THE EPIDERMIS OF EEL, ANGUILLA JAPONICA

Asakawa, Makio (Lab. Fish. Tech., Fac. Agr., Kyushu Univ., Fukuoka, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 1, 83-87 (January 1970) (In Japanese; figures, table, and summary in English)

Characterization and histochemical identification of eel mucus revealed that the mucin covering the eel was composed mainly of sialic acid-containing glycoprotein and sulfated mucopolysaccharide, the former being the predominant component. The first of these is secreted from goblet cells; the second, from columnar mucous cells. [6 figures, 1 table, 25 references] LB

0.38 (0.36) HISTIDINE METABOLISM IN FISH. IV. COMPARATIVE STUDY ON HISTIDINE DEAMINASES FROM MUSCLE AND LIVER OF MACKEREL AND FROM BACTERIA

Sakaguchi, Morihiko, and Motohiko Sugiyama (Research Institute for Food Science, Kyoto University, Kyoto, Japan), Toyoki Sugiyama (Ehime Junior Women's College, Uwajima, Japan), and Akira Kawai (Kyoto University)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 2, 200-206 (February 1970)

In the third part of the study on the histidine metabolism in fish, the authors reported on the specific behavior of histidine deaminase (histidine ammonia-lyase, 4.3.1.3) obtained from the muscle of mackerel (Scomber japonicus) toward some SH compounds and the metal chelator. In the present part, they undertake to confirm the specific properties of the muscle enzyme by comparing the effect of glutathione (GSH) and ethylenediaminetetraacetate (EDTA) on the activity, the Michaelis constant, and the molecular weight of the enzyme from mackerel muscle with those effects on the enzymes from mackerel liver and Pseudomonas fluorescens.

GSH activated the enzyme obtained from the bacteria and from the liver but not the enzyme obtained from the muscle; EDTA inhibited the enzyme from the bacteria and the liver but not from the muscle. The Michaelis constant of the enzyme from the bacteria was 2.7×10^{-2} M; from the liver, 7.8×10^{-4} M; and from the muscle, 3.3×10^{-5} M. The molecular weight of the enzyme proteins, as determined by the sucrose gradient method, obtained from the bacteria was 193,000; from the mackerel liver, 198,000; and from the mackerel muscle, 208,000. Because these values are virtually identical, the authors assigned a round molecular weight of 200,000 to the three enzymes.
[5 tables, 12 references] LB

0.6 APPLICATIONS OF WHIPPING AGENTS

Mansvelt, J. W. (Lenderink & Co., N.V., Schiedam, Holland)
Food Manufacture (Ingredient Survey--an annual supplement), pp. 16-17, 19-21 (March 1970)

Whipping agents, as defined by the author, are substances that make it possible to convert a liquid into a foam. Whipping agents are of different natures, and the type chosen for a particular application depends upon such factors as the composition of the liquid (particularly its carbohydrate content), the density (foam) desired, and the requirements for stability of the foam. Whipping agents may be classified in the following broad categories: (1) detergent-type products, including the alcohol sulfates; (2) emulsifier-type products, such as the partial esters of alcohols and fatty acids; (3) glucosides, saponins...; (4) cellulose derivatives; and (5) proteins.

The article discusses the various types of whipping agents and their uses, including the factors that should be considered in their evaluation and application. [20 references] FTP

0.5 (2.01)(9.6) PROGRESS IN INDUSTRIAL MICROBIOLOGY

Hockenhull, D. J. D. (ed.)
The Chemical Rubber Co., 18901 Cranwood Parkway, Cleveland, Ohio 44128 (1967), Vol. 6, 281 pp.
Reviewed by Manfred Kroger
Food Technology 24, No. 5, 76 (May 1970)

Seven reviews are presented on various aspects of industrial microbiology. The review on "The Bacteriology of Fish Spoilage and Preservation" was authored by J. M. Shewan and G. Hobbs. FTP

0.6 (9.6) FOOD INDUSTRIES MANUAL

Woolen, Anthony (ed.)
Leonard Hill Books Division of International Textbook Co. Ltd., London, England (20th Edition, 1969), pp. 509. Price £10.10s.
Food Manufacture 45, No. 3, 53 (March 1970)

This reference manual contains technical and commercial information on food products and plants. It contains one chapter on Fish Processing by C. L. Cutting. Twelve chapters cover other food products and related industries. One chapter deals with nutrition. FTP

1.0114 (1.11) SEASONAL AND GEOGRAPHIC CHARACTERISTICS OF FISHERY RESOURCES. CALIFORNIA CURRENT REGION--1. JACK MACKEREL

Kramer, David, and Paul E. Smith (Bureau of Commercial Fisheries Fishery-Oceanography Center, P.O. 271, La Jolla, California 92037)
Commercial Fisheries Review 32, No. 5, 27-31 (May 1970)

This is the first of a series of brief reports in which we intend to describe seasonal and geographic characteristics of the fishery resources in the California Current region. Emphasis will be placed on the use of summarized data to predict when and where adult spawning populations may be found--and whether or not such populations might be available to the fisheries during their spawning cycles. This first report deals with the jack mackerel.

...[The] data show that the major centers of spawning (49 percent or greater occurrence of larvae) occur first in March off southern California and northern Baja California; then, as the waters grow warmer, the major centers spread gradually northward as far as San Francisco in July. The absolute range of jack mackerel spawning areas has not been delimited by the CalCOFI [the California Cooperative Oceanic Fisheries Investigations]. We know from additional surveys by CalCOFI, and other organizations in the United States and Canada, that the jack mackerel populations may extend as far offshore as 800-1,200 miles, as far north as the Gulf of Alaska (Blunt, 1969), and as far south as Cape San Lucas.
[3 figures, 2 references]

Reprinted in part

1.35 (2.1476) SWIMMING BEHAVIOUR OF CHUM SALMON IN THE SOUTHEASTERN AREA OFF KAMCHATKA PENINSULA

Suzuki, Tsuneyoshi (Faculty of Fisheries, Hokkaido University)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 1, 19-25 (January 1970) (In Japanese; figures, table, and summary in English)

The author investigated differences in the swimming behavior of salmon at night and shortly after sunrise. He set two pairs of surface gill nets at right angles to each other, one net in a SW.-NE. direction and the other in a SE.-NW. direction. One pair of nets was set at midnight and one pair was set in the same place 1 hr. after sunup. Each pair remained in place for about 2 hr.

The salmon caught were mainly 4-year-olds belonging to the Kamchatka population. Those caught in the night nets seemed to swim in equal numbers from all directions; those caught in the morning nets swam in more abundant numbers in southeasterly and northeasterly directions, as would be expected from the migrating habits of this species. No special biological differences (age, composition, sex ratio, gonad weight, volume of stomach contents) were noted between the salmon caught at night and those caught in the morning.
[9 figures, 1 table, 15 references]

LB

1.013 (1.53) INFORME PRELIMINAR SOBRE EL CRUCERO "MERLUZA IV," EFECTUADO EN MARZO DE 1969 ENTRE LOS 31°25' Y 39°47' L.S. [PRELIMINARY REPORT ON THE CRUISE OF THE MERLUZA IV, MADE IN MARCH 1969 BETWEEN 31°25' AND 39°47' S. LAT.]

Anonymous
IFOP Circular No. 50, 19 pp. (December 1969) (Instituto de Fomento Pesquero, Departamento de Recursos Naturales, Sección Biología y Sección Distribución y Abundancia, Santiago, Chile) (In Spanish)

This report concerns a continuation of the seasonal cruises being made to study Chilean hake (Merluccius gayi)--the relation between oceanographic conditions and the distribution, concentration, and composition of the fish population. In the area covered during the cruise (from Los Vilos to Corral), appreciable concentrations of hake were found off the coast of Valparaiso, Punta Toro, Punta Duao, Iloca, and south of Lebu off the coast of Punta Ronca. In the rest of the area surveyed, hake was either quite scattered or totally absent. The dispersion could be mainly attributed to the abnormally large mass of subequatorial water (having high temperature and salinity and low oxygen content) that penetrated the coastal and southern fishing grounds throughout most of 1968. The major concentrations of hake were found in areas where oceanographic conditions were normal and oxygen content was greater than 1 ml./liter.

In addition to data on M. gayi, records were kept on the catches of Callorhynchus callorhynchus, Genypterus maculatus, G. blacodes, Prolatilus jugularis, Isacia conceptionis, Sebastodes sp., Hippoglossina macrops, Pleuroncodes monodon, Cervimunida johni, Heterocarpus reedi, and Hymenopenaeus diomedeae.
[11 figures, 1 table]

LB

1.2 (9.17)(9.3) HERRING - THE 'GOLDEN GOOSE' OF THE SEA

Tibbo, S. N. (Fisheries Research Board of Canada, St. Andrews, New Brunswick)
Fisheries Research Board of Canada Biological Station, St. Andrews, New Brunswick, General Series Circular No. 55, April 1970
Fisheries of Canada 22, No. 9, 9-13 (April 1970)

The author reviews the historical importance of herring fisheries in and to Western Europe and notes their movement westward. He cites statistics for the alarming, and often indiscriminate, landings of herring in the Northwest Atlantic during the past decade and shows the changes that have been made in the methods of catching and in the use of the catch. His conclusion from these data and the increasing encroachment of foreign nations into the Northwest Atlantic herring fishery is summed up in metaphoric pithiness: "The 'golden goose' is a 'sitting duck' and needs protection."

"How can we protect herring stocks so that all people can enjoy and profit from them in the years to come?" he asks. "Obviously we cannot do this without sufficient knowledge to provide a sound basis for management and such knowledge is not available now. But we do know what the problems are and what questions must be answered for rational exploitation and maximum economic benefit." He then summarizes the problems (the composition of the stock; the identity, characteristics, distribution, and relations of unit populations; and the recruitment and mortality rates), pointing out the diversity of management policies that may be called for once these problems are solved.
[10 figures]

LB

1.0154 (1.9) FISHING GROUND OF SAURY AND ITS OCEANOGRAPHIC CONDITIONS IN THE PACIFIC OCEAN OFF NORTHEASTERN JAPAN

Hotta, Hideyuki (Seikai Regional Fisheries Research Laboratory, Nagasaki, Japan), and Sin-ichi Fukushima (Tohoku Regional Fisheries Research Laboratory, Shiogama)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 2, 207-215 (February 1970) (In Japanese; figures and tables in English)

Figure 1. The total annual catch of saury in the Pacific Ocean off Northeastern Japan, 1894 to 1968.
Figure 2. A schematic representation of hydrographic conditions off Northeastern Japan.
Figure 3. Two sets of isotherm maps showing the relation between surface temperature and the saury fishing grounds in the Southern Kuriles, 1964 and 1965. The five maps showing this relation in 1964 (a cool, poor fishing year characterized by rapidly moving grounds) are plotted in 5-day periods from July 26 to September 10. The five maps for 1965 (a warm, good fishing year during which the fishing grounds moved slowly) are plotted mainly in 10-day periods from July 21 to September 10.
Table 1. The regulations governing the saury fishery, 1933 to 1969, showing the gear used (drift gill nets and dip nets), the opening and closing dates for Hokkaido and Honshu and for various sized vessels, and the permissible wattage of the luring light.
Table 2. The annual Soviet catch of saury, including the number of vessels used, 1958 to 1968. [3 figures, 2 tables, 87 references] LB

1.0117 FLORIDA'S UNTAPPED FISHERIES

Robinson, Peg
National Fisherman 51, No. 2, 10C-11C (June 1970)

Conservation, to Florida's Department of Natural Resources, is more than a limiting of exploitation; it is a realization of the best continuous profit from natural resources. To minimize the enormous waste that results when resources are bypassed, the Department's Marine Research Laboratory undertook Project Hourglass, a name that mirrors the shape of the area surveyed. Using a modified trawler, the scientists collected samples and data during 6-day cruises made once a month for 28 months, and covering 16 stations in the Gulf of Mexico.
Although analysis of the data is not complete, a great deal of information about commercially promising fisheries has been released. Some of the valuable fish waiting to be activated are rock shrimp, calico clam, shovel-nosed lobster, black bass, dusky flounder, scorpion fish, sand perch, vermillion snapper, calico scallop, black diamond clam, and thread herring. Some of these species of course, are fished elsewhere--or, at least, kindred species are. Invertebrates were collected in colossal numbers during the survey. Some 7,000 specimens belonging to about 1,400 species were taken; a good part of these fish were so unfamiliar that specialists had to be called on for identification.
As a result of the project, not only have huge quantities of edible marine animals been brought to light, but their harvesting depth, their top season, and the best way to catch them have been revealed. Moreover, as the supervisor of the laboratory points out, a knowledge of their seasonal occurrence and abundance will provide an improved understanding of factors controlling the food chain upon which all other life in the ocean depends. [5 photographs] LB

1.22 (1.0115) BRIT HERRING ALONG MAINE'S COAST

Davis, C. W., and J. J. Graham (Bureau of Commercial Fisheries Biological Laboratory, West Boothbay Harbor, Maine 04575)
Commercial Fisheries Review 32, No. 5, 32-35 (May 1970)

The Maine sardine industry prefers to can 2-year-old Atlantic herring, Clupea harengus harengus, but when they are not available, 1- and 3-year-old fish are used. To assist the industry in using the herring resource more efficiently, the BCF Biological Laboratory at Boothbay Harbor, Maine, seeks to predict the annual abundance and availability of the 2-year-old fish. As part of this program, herring are studied from the time they hatch in the autumn until the time they may enter the fishery 1 year later.
This preliminary report describes the summer distribution and relative abundance of 1-year-old, or "brit" herring, 2 to 4 inches in length, along the Maine coast in 1966-69.
This study and earlier explorations indicate that inshore populations of brit herring remain in the coastal waters throughout the summer. The heaviest concentrations were detected during early summer (late June to mid-July) in the central and eastern coastal areas....In subsequent cruises (mid-July to late August), the only brit observed were in upper Penobscot Bay, and even there they were scarce. No significant numbers of brit were found along the offshore cruise track in any year. [4 figures] Reprinted in part

1.121 (1.0112) ALBACORE OF HAWAIIAN WATERS (THUNNUS ALALUNGA)

Otsu, Tamio, and Ray F. Sumida (Bureau of Commercial Fisheries Biological Laboratory, P.O. Box 3830, Honolulu, Hawaii 96812)
Commercial Fisheries Review 32, No. 5, 18-26 (May 1970)

Only a small quantity of albacore is caught in Hawaiian waters by the long-line fishery, incidental to catches of other species of tunas and billfishes. The fish are large and appear to be part of the reproductive component of the North Pacific albacore population. The albacore arrive in Hawaiian waters in early summer after spending about 6 years in the temperate North Pacific.
This paper documents their occurrence, describes their size composition and abundance, and discusses their possible role in the North Pacific population. [6 figures, 5 tables, 18 references] Authors' abstract

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1.12 (9.6) TUNA DISTRIBUTION AND MIGRATION

Nakamura, Hiroshi
International Marine Publishing Company, 76 pp. (n.d.) $6.50 (paperbound)
National Fisherman 51, No. 2, 25 (June 1970)

The distribution and migration of the important tuna species are described in relation to the major ocean-current systems. LB

2.05 (1.85)(9.15) ISOLATION OF VIBRIO PARAHEMOLYTICUS FROM GULF OCEAN SHRIMP

Vanderzant, C., and R. Nickelson (Animal Science Department) and J. C. Parker (Agricultural Extension Service, Texas A&M University, College Station 77843)
Journal of Milk and Food Technology 33, No. 4, 161-162 (April 1970)

In 1968, Thatcher et al. reported that Vibrio parahemolyticus causes an infectious food poisoning that is associated with warm summer months and the consumption of raw seafood. Although most of the isolates have come from Japan (this bacterium causes 70 percent of the gastroenteritis there), it has been isolated from Puget Sound water, sediment, and oysters; from Gulf of Mexico and South Atlantic coast sediment; from Chesapeake Bay blue crabs; and from human infections attributable to bathing in sea water. The present study was prompted by the high mortality among brown shrimp (Penaeus aztecus) being kept for nutritional experiments in conjunction with shrimp-farming operations.

V. parahemolyticus isolated from white shrimp (P. setiferus) and added at a concentration of about 10^4 and 10^5 cells per milliliter of water to aquaria containing brown shrimp caused death in the brown shrimp within 3 hours. The bacterium was recovered in almost pure culture from the interior of the brown shrimps' cephalothorax region. The ubiquity of this microorganism and its demonstrated pathogenicity might cause reductions in yields of shrimp raised both in marine and in pond waters. Ingesting seafood contaminated with it could cause a food-poisoning situation similar to that in Japan, and handling infected shrimp could become a transmission path for human tissue infections.
[1 table, 10 references]

2.111 STRENGTH OF THE NETTING TWINE AGAINST A SINGLE BLOW

Honda, Katuji (Tokyo University of Fisheries, Konan 4, Minato-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 2, 139-146 (February 1970) (In Japanese; figures, tables, and summary in English)

The author investigated the strength on impact of two types of synthetic fibers used in the manufacture of fishing twines in Japan: Cremona (20 S/15 and 250 D/15), a polyvinyl alcohol, and Tetoron (22 S/15 and 250 D/15), a polyester. Usually in impact tests the impulsive force is applied horizontally to the twine; in this test, the impact force was applied vertically by either solid or cylindrical cutting pieces attached to a pendulumlike device. During the tests, the impact velocity (m./sec.) and the energy needed for fracture (kg.·m.) were observed and calculated for both twines. The results showed that, irrespective of the magnitude of the exerted force, a constant energy was needed to fracture the test twine. However, the energy required varied only as the length of the twine varied. The greater the breaking strength of the twine and the greater its capacity to elongate, the more the energy required for the fracture.
[6 figures, 4 tables]

2.115 (2.15) RECENT DESIGNS OF SEMI-AUTOMATED FISHING VESSELS. PART 1

Doust, David, and J. Logan (Central Design and Drafting Ltd., Montreal, Canada)
Fishing News International 9, No. 4, 18-20, 23-24, 27 (April 1970)

This two-part article is based on a paper the authors prepared for the Conference on Automation and Mechanization in the Fishing Industry, held in Montreal in February.

Studies of various types and sizes of fishing vessels revealed that widely different dimensions have been adopted for similar hold capacities. Thus some owners are incurring a much heavier first cost for their vessels than are others whose vessels have an almost identical earning potential. In addition, some designs provide insufficient stability and freeboard for vessels carrying a full load of fish, particularly herring, and make little or no provision for withstanding the arduous weather conditions that are characteristic of the fishing grounds off Canada's east coast. This article discusses several new designs that have been developed in light of first-cost considerations, safety, and efficiency of the vessel as a catcher and carrier of fish. Particular features discussed are (1) fish deck areas and net handling arrangements, (2) fish processing areas and distribution of the catch to and from the fishholds, (3) bridge control and visibility, (4) adaptability to alternative forms of fishing, (5) safety of the vessel, (6) safety of the crew, and (7) vessel performance and maintenance.

(over)

2.144 (9.1) BEHAVIOUR OF FISHES IN RELATION TO MOVING NETS. I. EFFECT OF DIFFERENTLY COLOURED LIGHTS ON THE CATCH BY A MODEL NETS

Nambiar, K. P. P. (Central Institute of Fisheries Technology, Cochin-11, India), Yoshio Hiyama (University Museum, University of Tokyo, Bunkyo, Tokyo, Japan), and Takaya Kusaka (Ocean Research Institute, University of Tokyo, Nakano, Tokyo)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 2, 135-138 (February 1970)

A thorough knowledge of the locomotor and avoidance responses of fish swimming ahead of moving nets is essential for the proper design and operation of such gear. Blaxter et al. (1964) established that the response of fish to the various parts of the fishing gear is influenced by the nature of the gear material, particularly its color and visibility. Thorpe (1962) and Munta et al. (1966) reported that teleosts, with few exceptions, can distinguish colors regardless of their intensity. Foster (1967) pointed out that the physiological condition of the fish and such environmental factors as water temperature also influence the response of the fish to the gear. However, information about the effect of such factors on the avoidance responses of fish swimming ahead of fishing nets is limited. The preliminary experiment reported here was undertaken to acquire information about the effects of some physical and biological factors on the response of small fresh-water fish when driven by model nets inside the laboratory.

(over)

2.111 SPLICING WIRE AND FIBER ROPE
(9.6)

Graumont, Raoul, and John Hensel
International Marine Publishing Company, 128 pp. (n.d.) $3.00
National Fisherman 51, No. 2, 5S (June 1970)

In addition to a thorough treatment of 259 kinds of splices, this book contains tables of wire and rope sizes, characteristics, and strengths; a section on rigging tackle, including the resulting power with and without friction; and a marlinspike glossary. [324 photographs and drawings] LB

2.111 HOW TO MAKE AND SET NETS
(9.6)

Garner, John
International Marine Publishing Company, 95 pp. (n.d.) $6.50
National Fisherman 51, No. 2, 3S (June 1970)

Because of its many detailed drawings and its clear writing, this book is an easy-to-follow presentation of how to make and set machine-made nets. It contains a glossary of about 1,000 terms applicable to fishing gear.
[58 drawings] LB

2.113 CORROSION OF METALS IN TROPICAL WATERS. STRUCTURAL FERROUS METALS

Southwell, Charles R., Allen Leander Alexander (Nav. Res. Lab., Washington, D.C.)
Chemical Abstracts 72, No. 14, 70542p (April 6, 1970)

2.144

Using a net made of white nylon webbing with 1 cm. mesh openings, the authors towed the net at a constant speed of 21.25 cm./sec. from one end of a 200-cm.-long fish tank to the other. The tows were made under green, red, or white light or with no illumination; the lights were turned on 5 min. before each test.

The highest catch was made under red light, the next highest with no illumination, and the lowest under green light. Under the red light, and when there was no illumination, the fish seemed quite disturbed and swam ahead of the net in irregular patterns. Under the green light and the white light, the fish seemed calm and swam steadily away from the direction in which the net was traveling. The author concludes that the difference in catch and reaction indicates a difference in the effect of various light-wave lengths on the fish.
[1 figure, 1 table, 13 references]

2.1110 FISHERMAN'S KNOTS AND NETS
(9.6)(2.112)

Graumont, Raoul, and Elmer Wenstrom
International Marine Publishing Company, 218 pp. (n.d.) $4.00
National Fisherman 51, No. 2, 4S (June 1970)

With text and photographs, this book describes 437 knots most useful to the commercial fisherman. It includes chapters on fishing traps and seines, and net making and repairing. LB

2.01 EFFECT OF TEMPERATURE ON THE TRIMETHYLAMINE OXIDE REDUCTASE ACTIVITIES OF BACTERIA

Okitsu, Tomoaki (Saitama Institute of Public Health, Omiya, Saitama, Japan), and Toshiharu Kawabata (Department of Food Research, National Institute of Health, Shinagawa-ku, Tokyo)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 2, 195-199 (February 1970) (In Japanese; figures, tables, and summary in English)

Trimethylamine (TMA) is formed in fish muscle during deterioration, primarily as a result of the reduction of trimethylamine oxide (TMAO) by bacteria. However, the amount of TMA produced does not always parallel the growth of the bacteria, especially when the fish muscle is kept at lower temperatures. The authors examined (1) the effect of TMAO in the culture medium (incubated at 10°, 20°, or 30° C.) on the TMAO reductase activity of Escherichia coli and of Pseudomonas species, measured at reaction temperatures ranging from 10° to 50° C.; and (2) the TMAO reductase activity of the washed bacterial cells incubated at various temperatures for various times and measured at 20°, 30°, and 40° C.

1. The TMA formed by E. coli cultured in a nutrient broth containing 0.01 M TMAO was apparently retarded at 20° C. and virtually inhibited at 10° C.; that formed by Pseudomonas species reached maximum levels after 1 day's incubation at 20° or at 30° C., and after 4 days' incubation at 10° C.

2. The highest TMAO reductase activity of the washed cells of E. coli occurred at 40° C.; of Pseudomonas species, at temperatures between 30° and 40° C.

As for the formation of TMAO reductase of the test organisms, the authors confirmed that the enzyme was constitutive, not adaptive. They noted that cells harvested from cultures grown at low temperatures had almost the same TMAO reductase activity as did cells harvested from cultures grown at higher temperatures.
[3 figures, 2 tables, 8 references] LB

2.115

This part of the article treats the first four of these aspects. It contains 8 figures and 3 tables.

Part 2 of the article, which will appear in the May issue of "Fishing News International," will discuss the last three aspects.

Although references in the article are to an advanced semiautomated stern trawler, the authors suggest that the type of ship they describe would, with modifications, be applicable to a number of other types of fishing vessel.

2.15 STABILITY AND TRIM OF FISHING VESSELS
(2.115)(9.6)
(0.8)

Hind, J. Anthony
International Marine Publishing Company, 120 pp. (n.d.) $6.00
National Fisherman 51, No. 2, 2S (June 1970)

This book was written to help masters and mates know how to load their vessels for optimum stability and seakindliness. The 11 chapters deal with the following subjects: first principles, initial or metacentric stability, inclining experiments, inertia and free surfaces, stability at large angles, trim, docking and grounding, dynamical stability and motion in a seaway, stability after damage, stability information aboard ships, and formulas and approximations.
[Illustrated with diagrams and photographs] LB

2.1477 (1.125) STUDY ON THE ANGLING MECHANISM FOR SKIPJACK

Kariya, Teiji (Dept. Fish. Fac. Agr. Tohoku University, Kita-6, Sendai, Japan), and Hideyuki Hotta (Seikaiku Regional Fish. Res. Laboratory, Nagasaki)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 1 (January 1970) (In Japanese; figures, tables, and summaries in English)

I. ON THE ANGLING CURVE, pp. 35-41.

Shoals of skipjack are often found near a whale shark, sei whales, or large pieces of driftwood, and sometimes near a shoal of other, smaller fish. The largest catch of skipjack made during the authors' survey came from a shoal associated with a whale shark; 2,164 fish were caught from this shoal in 44 min. They made the survey to see whether or not information learned about the mechanism of angling for mackerel (previously reported) could be applied to angling for skipjack.

No correlation could be found between the number of fish angled from a shoal and the angling period or between the total number of fish angled and the maximum number caught per minute per fisherman. The angling curves obtained when angling time (in minutes) was plotted against the maximum number of fish caught/min./fisherman were classified into three types: (1) the decreasing type, having a peak and a bottom; (2) the ceiling type, having a flat peak and a bottom; and (3) the multiple decreasing type, having two or more peaks and bottoms. This last type curve coincided with the type obtained during experimental angling for mackerel. [4 figures, 2 tables, 4 references]

3.231 CONTROLLED ATMOSPHERE COLD ROOMS. STORAGE OF QUICK-FROZEN PRODUCTS. REFRIGERATION SCIENCE AND TECHNOLOGY

International Institute of Refrigeration, 177 Boulevard Malesherbes, 75-Paris 17e, France (1968), 143 pp.
Reviewed by Norman E. Bednarcyk
Food Technology 24, No. 5, 76 (May 1970)

This book reports the proceedings of two symposia held in Avignon, France, on October 9-11, 1968 by the International Institute of Refrigeration. The two topics discussed were: (1) technical, structural, and operational problems of frozen food storage and (2) gas-tightness of controlled atmosphere storage buildings. The papers are in French or English with a summary in the other language. The reviewer states that the articles are technical and detailed and are, therefore, an important contribution to the literature on cold storage.

2.9 (1.89)(6.72) STUDIES ON MARINE TOXINS. XXVII. PURIFICATION OF THE IVORY SHELL TOXIN

Shibōta, Masaki, and Yoshiro Hashimoto (Laboratory of Marine Biochemistry, Faculty of Agriculture, The University of Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 1, 115-119 (January 1970)

In 1967, the authors and their coworkers reported that a toxin having a strong mydriatic activity was present in the midgut gland of Japanese ivory shells (Babylonia japonica), marine gastropods, taken from a toxic area of Shizuoka Prefecture. They also reported a sensitive method for assaying the toxin. In the present paper, they describe the method used to purify the toxin and the chemical properties of the toxin so obtained.

The toxin was purified by gel filtration with Sephadex G-25 and silica gel column chromatography. The final product was a faintly yellow powder that evoked mydriasis in mice at a dose as low as about 0.02 µg./g. body weight; 5 mg. (toxicity 0.025 µg./g.) dissolved in 1 ml. of physiological saline and injected subcutaneously into a 2.5 kg. cat produced symptoms quite similar to those produced by administration of the raw midgut gland. The toxin's infrared spectrum, elementary composition, and behavior during gel filtration indicate that it is a polyfunctional, highly oxygenated, complex bromo compound of relatively low molecular weight. [3 figures, 2 references]

3.236 (3.237)(0.6) LEMON FLAVOR FOR FISH SURVIVES FRYING, BAKING

Anonymous
Food Processing 31, No. 5, 24 (May 1970)

Although lemon flavors are a desirable adjunct to seafoods, their addition directly to breading has been impractical--spray-dried lemon flavor is too expensive to be added in sufficient quantities to be effective, and liquid or plated oils or flavors are too volatile to withstand cooking. Now, however, a special technique for entrapping flavor oils protects the flavor from heat and prevents it from being released until the product is eaten.

The process, called microencapsulation, involves suspension of hydrophobic flavors in a dispersion of two hydrophobic colloids. Adjusting the pH and cooling the dispersion alters the electrostatic forces of the colloids and causes a mutual precipitation around the oil droplets. The resulting mixture may be used either as a stabilized liquid slurry or as a free-flowing dry powder. Special gelatins may be used to produce capsules having a melting point of from 45° to 100° C., and modifying agents can be added to harden the droplets so that the flavor will not be released until pressure is applied.

A typical breading mix demonstrated the low level of lemon microcapsules needed: 51.8 percent flour, 41.8 percent bread crumbs, 4.5 percent salt, 0.6 percent pepper, and 1.3 percent microencapsulated lemon flavor. Fish fillets and shrimp dipped in milk and breaded with from 10 to 15 percent of this mix were fried in deep fat at 375° F. for 4 min. The resulting light-brown fillets had a

(over)

2.9 NEUTRALIZATION OF SHELLFISH POISON BY CHEMICAL DISINFECTANTS

Chin, Choo D. (Research and Radiological Division, Industrial Health and Safety Directorate, Fort Detrick, Frederick, Maryland 21701)
Toxicology and Applied Pharmacology 16, No. 2, 430-433 (March 1970)

Paralytic shellfish poison is toxic for man--ingestion of 1 mg. of the poison may be fatal. Because no antidote is known, working with the concentrated material in the laboratory is hazardous. The poison is resistant to heat--exposure of the poison to 20 p.s.i.g. (121° C.) for 24 hours in an autoclave has no effect on its toxicity.

The purpose of the present study was to find a practical decontamination agent that would neutralize the poison on contact during laboratory use. Seven common chemical disinfectants were tested: sodium hypochlorite (NaOCl) at various concentrations; β-propiolactone (PPL) at 1 percent; Lysol at 5 percent; formaldehyde (HCHO) at 0.5 percent; iodine (I_2) at 0.5 percent in 1.5 percent KI solution; Roccal at 1 percent; and peracetic acid at 1 percent.

Sodium hypochlorite, at a concentration of 3 parts of NaOCl per million per microgram of poison at room temperature (25° C.) neutralized the toxicity of the poison. The other six chemicals tested were not as effective as the hypochlorite was. [1 table, 7 references] FTP

2.9 MARINE PHARMACOLOGY. A STUDY OF TOXINS AND OTHER BIOLOGICALLY ACTIVE SUBSTANCES OF MARINE ORIGIN (0.35)(0.4)

Baslow, Morris H. (Williams and Wilkins: Baltimore, Maryland)
Chemical Abstracts 72, No. 7, 30252n (February 16, 1970)

3.236

definite lemon flavor that compared quite favorably with fillets flavored with fresh lemon juice. The breading was crisp, and the flavor was evenly distributed throughout the product. The dry capsules can be added to consumer breading mixes, institutional blends, or frozen prepared products. The fresh lemon flavor is retained equally well in fried or baked seafoods.

3.236 CERTIFIED COLORS REPLACE NATURALS. . . (0.6)(3.237) REDUCE INGREDIENT COSTS, IMPROVE PRODUCT UNIFORMITY

Klinatson, J. W., and Robert Hemminghaus (Warner-Jenkinson Manufacturing Co., 2526 Baldwin Street, St. Louis, Missouri 63106)
Food Processing 31, No. 5, 14-15 (May 1970)

Natural colors--including paprika, turmeric, cochineal, caramel color, cocoa, iron oxide, and carbon black--can vary widely; moreover, their costs fluctuate from season to season. Improved shelf life, reduced ingredient costs, better processing tolerances, wider availability, and freedom within regulatory limits are some of the advantages of properly formulated blends of synthetic coloring ingredients. Examples of commercial uses for certified color additives that can be used to replace natural colorants are given. One of these is the replacement with a synthetic yellow colorant of the oleoresin paprika used in the breading for fish and poultry products. At $4.50 a pound for paprika (though the authors point out that the price of oleo-paprika varies widely, currently being substantially more than $4.50), the saving would be $6.50 per ton. Since paprika contributes little to the flavor of a food product, substitution of the synthetic colorant is relatively simple. [2 figures, 2 tables] LB

2.1477

II. ON THE TIME REQUIRED TO FISH, pp. 42-47.

In 1969, the authors and a coworker reported that the process of angling can be divided into two periods: the time required for the fish to be hooked and the time required for the angler to bring the fish in. In the present paper, they examine the relation between the time required to bring the fish in and the technical skill of the angler; since the fishing boat may keep in contact with the shoal for only a short time, it is advisable for the angler to bring the fish in as quickly as possible.

Skipjack can be fished either with live bait or with lures. In one type of lure fishing, called "kakaezuri," the angler holds the hooked fish under his free arm while detaching it from the lure; in another type, called "tatakizuri," the angler detaches the hooked fish without holding it. Live bait fishing involves six operations, whereas lure fishing, which does not entail baiting the hook, involves only five. Baiting the hook takes about 10 sec. The mean time required to bring in a fish caught with live bait is 16.1 sec.; that required during kakaezuri and tatakizuri fishing is 5.99 and 1.96 sec., respectively. Although tatakizuri fishing takes the least time, it requires great skill and heavy labor, therefore it can be used for only short periods of time.

The time required to fish is also affected by the type of fishing tackle used. The type of angling rod (its length, its diameter at each end, and its bending strength), the line, and the distance from the hook to the thick end of the rod are examined. [2 figures, 3 tables, 2 references]

2.113 E. DARMOIS CORROSION COEFFICIENT. NEW CONCEPT IN CORROSION

Maurin, A. J.
Chemical Abstracts 72, No. 14, 73886q (April 6, 1970)

3.231 FREEZE DRYING

British Patent 1,173,720
Laybold-Heraeus-Vertwaltung GmbH (504 Bonner Strasse, 5, Koln-Bayental, Germany)
Refrigeration and Air Conditioning 73, No. 865, 96 (April 1970)

The temperature at the center of histological samples to be freeze dried must be -67° F., thus the temperature of the apparatus must be even lower. A new device employs thermo-electric modules that make use of the Pellier effect to produce this temperature-lowering effect. LB

3.231 QUICK FREEZING SOLID FOODS

British Patent 1,173,348
A. E. Wentworth and Associates Inc. (P.O. Box 19278, Tampa, Florida) (pat.)
Refrigeration and Air Conditioning 73, No. 865, 96 (April 1970)

Solid foods such as shrimp, oysters, citrus fruit segments, and meat patties can be individually frozen on the internally refrigerated surface of a rotary drum. Since the temperature of the internal surface of the drum is low enough to cause a frozen bond to form between the food and the drum, the food is held firmly in place. LB

3.23 TUNA PROCESSING (1.12)

Swartz, William E. (Calgon Corp.) (pat.)
U.S. Patent 3,493,392
Chemical Abstracts 72, No. 15, 77658q (April 13, 1970)

3.3349 (1.88) ELABORACIÓN DE CHOLGAS Y CHORITOS EN CONSERVA [CANNING MUSSELS]

Anonymous
IFOP Circular No. 52, 20 pp. (January 1970) (Instituto de Fomento Pesquero, Departamento de Tecnología, Santiago, Chile) (In Spanish)

This circular explains the procedure to be used in canning cholgas (Aulacomya ater) and choritos (Choromytilus chorus), two species of Chilean mussel. The object is to assist canners not only in raising the quality level of their product but in diversifying their operation. Using the IFOP pilot plant in Santiago and the techniques and types of equipment approved in France, Spain, Scotland, Denmark, and the United States, the Chilean technologists arrived at a method for producing four high-quality canned-mussel products: smoked mussels, mussels packed in oil, mussels packed in sauce, and mussels au naturel. The significance of the method, aside from its assurance of quality, is its simplicity and the ease of diversification it promises.

The 27-step procedure is illustrated graphically by a classical flow process chart (showing operations, transportations, inspections, delays, and storages). Between the second wash and the transportation to the packing room, mussels au naturel are drained, mussels to be packed in sauce are rinsed, mussels to be packed in oil are rinsed and exhausted of excess water, and mussels to be smoked are rinsed and smoked. Thereafter the processing lines again converge.

The four products were tested by organoleptic panels at IFOP and in Europe (from samples sent there for analysis). The returns indicate that all four will be well received both in Chile and in foreign markets.
[8 figures, 3 tables, 1 flow chart]

LB

3.336 (1.85) DUAL SCORE FOR CANNING LINES

Anonymous
Modern Packaging 43, No. 5, 84-85 (May 1970)

A shrimp cannery in Louisiana has installed automatic net-weigh can fillers that effect a 75 percent savings in labor costs. Furthermore, the shrimp are filled into the cans to an accuracy of ±1/8 ounce.

The process using the net-weigh fillers is as follows. The shrimp are shelled, deveined, and parboiled. The parboiled shrimp are graded to size mechanically, then conveyed by way of batch hopper and vibrating feeders to a surge hopper located above the net-weigh filler. The filler is equipped with 20 vibrating-pan, scale-mounted feeders that radiate from the central shaft like spokes of a wheel. The feeders jostle the shrimp to the filling funnels at the extremities. Each pan feeder on the rotating turret is intentionally overfilled and the vibrator shakes off the excess of shrimp (trimmed) to reach the target weight of the shrimp.

The shrimp batches are trimmed within one-third of a revolution of the turret and are checkweighed when the feeder scales have stabilized. If the checkweight reading of the batch is within a predetermined tolerance, a can is indexed into the machine and then filled. If the batch of shrimp is off weight, the can is held back and the feeder dumps the batch into a collection hopper beneath the filler. The trimmed shrimp and dumped batches are returned to the surge hopper. The filled cans proceed to the brining and closing stations. The article contains references to further information on in-line checkweighing and net-weigh filling equipment and on suppliers of equipment and services. [3 illustrations]

FTP

3.64 FREEZE-DRIED TURKEY MUSCLE
1. CHANGES IN NITROGENOUS COMPOUNDS AND LIPIDS OF DEHYDRATED TURKEY DURING STORAGE

Fishwick, M. J., and S. Zmarlicki (Agricultural Research Council, Food Research Institute, Colney Lane, Norwich, NOR 70F, England)
Journal of the Science of Food and Agriculture 21, No. 3. 155-160 (March 1970)

Dehydrated foods may, during storage, discolor, develop off-flavors, and change texture. These reactions can be kept to a minimum if the residual moisture content of the dehydrated food is low, and if the product is stored in an inert atmosphere and at low temperature. However, the pink color of freeze-dried meats is lost when they are stored in nitrogen or in air because of changes in the heme pigments, and because of certain types of browning reactions that seem to develop more readily in a nitrogen atmosphere than in an air atmosphere.

Oxidative deterioration of freeze-dried raw meats involves mainly the proteins (or amino acids) and the lipids. Under certain conditions of storage, oxidative changes other than rancidity can take place in foods with the development of a yellow-brown discoloration and stale "mealy" flavors. The purpose of the present study was to determine the contribution of the various reactions to the overall deterioration of freeze-dried turkey muscle during storage.

Freeze-dried turkey breast muscle was stored in air and in nitrogen at 37° C. Changes in the proteins and lipids were followed during the course of storage of the samples over a period of 109 days. Tests were made for absorption of oxygen,

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FTP

3.64 FREEZE-DRIED TURKEY MUSCLE
II. ROLE OF HAEM PIGMENTS AS CATALYSTS IN THE AUTOXIDATION OF LIPID CONSTITUENTS

Fishwick, M. J. (Agricultural Research Council, Food Research Institute, Colney Lane, Norwich, NOR 70F, England)
Journal of the Science of Food and Agriculture 21, No. 3, 160-163 (March 1970)

In part I of this study, Fishwick and Zmarlicki (1970) demonstrated that the heme pigments in freeze-dried turkey breast muscle were relatively inactive catalysts in the autoxidation of the unsaturated fatty acid constituents of the tissue lipids. The pigments of fresh meat, myoglobin and oxymyoglobin, are ferrous porphyrin complexes and are not active catalysts of lipid autoxidation--the ferric-containing pigments are the active form. Ferrous nitric oxide-hemochromagen (the stable form of pigment in cured meat) is inactive, but metmyochromagen causes lipid oxidation in cooked meats. Apparently the ability of metal coordination compounds to act as catalysts is closely related to the electronic configuration of the coordinated metal and particularly to the ligands which occupy the fifth and sixth coordination positions of the metal ion. These factors also influence the absorption and reflectance spectra; therefore, interpretation of spectra in terms of quantum-mechanical theories provides a means for identifying the active state of iron prophyrin complexes responsible for the catalysis of lipid autoxidation in cooked and cured meats. This part II reports on a study of the reflectance spectra of heme pigments in freeze-dried turkey muscle to establish

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3.63 (3.2349) ATMOSPHERIC FLUIDIZED BED FREEZE DRYING

Malecki, G. J., P. Shinde, A. I. Morgan, Jr., and D. F. Parkas (USDA Western Utilization R&D Division, Albany, California 94710)
Food Technology 24, No. 5, 93-95 (May 1970)

Freeze dried foods are highly acceptable; however, cost of freeze drying them is high. The present study was carried out to determine the feasibility of freeze drying frozen apple juice and frozen egg albumin solution in a fluidized bed. Both products were first spray frozen in a stream of liquid nitrogen.

The atmospheric drying of apple juice is not feasible because the frozen juice droplets dry slowly (0.6 percent weight change per hour) at their caking point temperature of -34° C.

Egg albumin particles fluidized well in air (6.5 percent weight change per hour) at -20° C. The drying rate was independent of air flow.

A process for fluidized drying of spray frozen biologicals and proteins is covered by a public service patent (U.S. Patent No. 3,313,032). [2 figures, 7 references] FTP

3.9 HIGH PROTEIN FOODSTUFFS

Canadian Patent 827,118
Perkins, M. B., and L. E. Furlong; Esso Research and Eng. Co. (pat.)
Food Technology 24, No. 4, 150 (April 1970)

Protein foods are produced from the aerobic fermentation of compositions containing C1 to C35 hydrocarbons, nitrogen compounds, phosphorus compounds, and inorganic salts of sodium, potassium, magnesium, calcium, iron, and manganese. FTP

3.9 SPUN PROTEIN FOODSTUFF

Canadian Patent 827,089
Pago, J. A., and W. G. Bauer; General Mills, Inc. (pat.)
Food Technology 24, No. 4, 150 (April 1970)

Smoke-flavored spun protein fiber is dried to a moisture content of from 5 to 25 percent; then it is toasted and coated with fat. FTP

3.64 (3.336) EFFECT OF THE INTENSIFICATION OF THE STERILIZATION OF CANNED FISH ON ITS FOOD VALUE

Valyavskaya, M. E. (Odess. Tekhnol. Inst. Pishch. Kholod. Prom., Odessa, U.S.S.R.)
Chemical Abstracts 72, No. 9, 41849p (March 2, 1970)

why the pigments are not active as catalysts for autoxidation of the lipid constituents.

Freeze-dried turkey leg and breast muscle were used. The reflectance spectra of the heme compounds of the muscle samples were determined with a Unicam recording spectrophotometer (SP800) fitted with an appropriate reflectance attachment and standardized against magnesium oxide.

The myoglobin of turkey leg and breast muscle changes during the freeze-drying process to form a low-spin complex, ferromyochromagen. Ferrimyoglobin in fresh muscle, or introduced as an oxidation product during dehydration, forms the corresponding ferrimyochromagen. The iron complexes, during storage of the freeze-dried muscle, do not catalyze the autoxidation of unsaturated lipids. When freeze-dried turkey muscle is rehydrated to a water content not less than 50 percent of that of fresh muscle, a portion of the heme pigment is present in the form of a high-spin complex, metmyoglobin, which catalyzes autoxidation of unsaturated lipids in the rehydrated muscle. [3 figures, 1 table, 12 references]

3.9 DRIED MEAT PRODUCT

British Patent 1,168,693
Armour & Co. (pat.)
Food Technology 24, No. 4, 84 (April 1970)

Mixtures of comminuted meat, water, salt, and flavorings are foamed and then dried by microwave energy. FTP

3.64

free fatty acids, phospholipids, lipid browning, lipid oxidation, heme pigments, reducing compounds, nonenzymic browning, soluble nitrogen, total sulfhydryl groups, and reactive sulfhydryl groups.

Oxidation of the sulfhydryl groups accounted for part of the oxygen uptake of the air-stored samples of freeze-dried turkey breast muscle, and was accompanied by a decrease in soluble nitrogen greater than that occurring in the controls stored in nitrogen. The major deteriorative reaction that occurred in the muscle at low moisture content was a type of "lipid" browning that depended upon the presence of oxygen and caused discoloration and objectionable odors. Autoxidation of lipids catalyzed by heme pigments and resulting in rancid flavors was not a major reaction in the deterioration of freeze-dried turkey breast muscle. Hydrolysis of the lipids occurred when the moisture content of the muscle was 8.2 and 5.4 percent, but not when it was 0.8 percent. [4 figures, 5 tables, 28 references]

3.9 HIGH PROTEIN SNACK

U.S. Patent 3,480,442
Atkinson, W. T.; Archer-Daniels-Midland Co. (pat.)
Food Technology 24, No. 4, 148 (April 1970)

Mixes of solid protein derivatives containing 30 percent by weight of protein are extruded at 200° to 480° F. and at least 1,000 p.s.i. pressure to produce friable, crisp, edible snack foods. FTP

3.335 CANNED FOOD PRODUCTS

U.S. Patent 3,480,450
Edlin, R. L., and J. K. Rocks; Kelco Co. (pat.)
Food Technology 24, No. 4, 148 (April 1970)

A canned, creamed, food product is prepared from meat (or poultry, or fish, or broth), starch, material containing calcium, water-soluble alginate, and water-soluble magnesium salt. FTP

5.7 (0.7) STUDIES ON VITAMIN E ACTION: PEROXIDATION INHIBITION IN STRUCTURAL PROTEIN-LIPID MICELLE COMPLEXES DERIVED FROM RAT LIVER MICROSOMAL MEMBRANES

Tinberg, Harold M., and Albert A. Barber (Department of Zoology, University of California, Los Angeles 90024)
Journal of Nutrition 100, No. 4, 413-418 (April 1970)

Vitamin E and butylated hydroxyanisole (BHA) inhibit lipid peroxidation in microsomal suspensions and in a test system consisting of microsomal structural protein and lipid micelles. A common inhibitory mechanism is suggested by the similarity of the two systems in their response to the two inhibitors. Gas liquid chromatography was used to demonstrate that peroxidation in the complex was accompanied by decreases in oleic and linoleic acids and by complete disappearance of arachidonic acid. The structural protein used in these experiments bound vitamin E but not the synthetic antioxidant, suggesting that the binding may involve the hydrocarbon chain of vitamin E. This association may be hydrophobic in nature. Vitamin E inhibition of peroxidation in the complex is correlated with the amount of the antioxidant bound, whereas inhibition by butylated hydroxyanisole is not. A possible difference in the physiological action of vitamin E and BHA was suggested on the basis of these binding differences.
[3 figures, 1 table, 25 references]

Authors' abstract

6.195 PUTTING RESEARCH TO WORK

Morrison, S. H. (reviewer)
Comparisons of Simple and Complete [sic] Diets for Baby Pigs: Effect of Form of Feed and of Glucose Addition
Bayler, H. S., and W. E. Carlson (University of Guelph, Guelph, Ontario, Canada)
Journal of Animal Science 30, No. 3, 394-401 (March 1970)
Feedstuffs 42, No. 19, 43-44 (May 9, 1970)

Pig starter diets are of two basic types: simple, consisting largely of corn and soybean meal; and complex, containing such other sources of protein as fish meal or skim milk. The expediency of feeding each has its advocates. The animal science group at the University of Minnesota is one of the chief advocates of the simple starter; their extensive research has shown that these diets are as good, or nearly so, as more complex starters, and, since the complex starters are more expensive, they consider it uneconomical to feed them. Despite little or no real scientific evidence, some commercial feed men and swine producers strongly defend the use of complex starters as being worth their higher price. The object of the experiments reported here was to compare the performance of baby pigs fed one of these diets, to evaluate the effect of adding glucose to the diets, and to compare the effects of feeding the diets as meal or as crumbles.

Two experiments were run. In the first, 16 male crossbred pigs (four groups of four pigs each) were fed a simple or a complex diet, either in meal or pellet form, for 4 weeks. In the second, three replicate pens of four gilts and four boars each were fed simple or complex diets, with or without 5 percent corn sugar

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6.192 (6.193) SUBSTITUTION OF ANIMAL PROTEIN SUPPLEMENTS WITH SOYBEAN MEAL IN LAYING RATIONS

Biely, Jacob (Department of Poultry Science, University of British Columbia, Vancouver, B.C., Canada)
Feedstuffs 42, No. 17, 18-19 (April 25, 1970)

The nutritive value of a protein, whether of animal or vegetable origin, depends on its amino-acid composition and content. A considerable body of experimental evidence has shown that synthetic amino acids can be utilized as well as natural ones. On the other hand, animal protein concentrates are believed to contain some factor or factors that are beneficial under certain stress conditions. The present theory is that the response obtained with supplementary products of animal or marine origin is in many instances attributable to an improvement in the amino-acid balance of the diets rather than to the activity of an unidentified growth factor.

The author fed 17 strains (about 4,300 birds) of laying pullets either a control ration (in which 3 percent was 50-percent meat meal, 2 percent was 65-percent fish meal, and 1 percent was dried whey) or an all-plant ration (in which the soybean meal was increased by 6 percent to compensate for the lack of animal protein). The rations were isocaloric and isonitrogenous and contained the same supplementary levels of vitamins and minerals. Both were fed to the end of the laying year--from pullet age 147 to 500 days. The birds' performance data are summarized on the back of the card.

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LB

6.32 OCCURRENCE OF D-2-HYDROXY-3-AMINOPROPANE SULFONIC ACID AND 3-AMINOPROPANE SULFONIC ACID IN A RED ALGA, GRATELOUPIA LIVIDA

Miyazawa, Keisuke, Keiji Ito, and Fumio Matsumoto (Faculty of Fisheries and Animal Husbandry, Hiroshima University, Fukuyama, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 1, 109-114 (January 1970)

In 1969, the authors reported finding two unidentified sulfur-containing amino acids in Grateloupia livida. In the present paper, they isolate and identify them.

The major aminosulfonic acid resembled D-cysteinolic acid (2-L-amino-3-hydroxypropane sulfonic acid); however, it clearly differed from that acid in melting point (268° C.), specific rotation, periodate consumption (0.5 mole), and infrared (IR) spectrum. On the basis of nuclear magnetic resonance spectra and comparison with the authentic specimen synthesized, the substance was identified as d-2-hydroxy-3-aminopropane sulfonic acid, an isomer of D-cysteinolic acid. The authors suggest that this may be the first time the substance has been detected in a biological source.

The minor aminosulfonic acid was identified as 3-aminopropane sulfonic acid (homotaurine) on the basis of its IR spectrum. The authors suggest that this is the first time homotaurine has been found in marine algae.
[5 figures, 1 table, 9 references]

LB

6.192

Variable measured	Type diet fed	
	Control	All-plant
Mortality (%)	15.3	15.3
Mean age to death (days)	291.5	304.6
Eggs per bird (number)		
hen housed basis	209.7	214.4
hen day basis	229.6	234.0
Feed/bird-day (ounces)	3.78	3.79
Feed/12 eggs (pounds)	4.34	4.26
Feed/lb. eggs (pounds)	2.82	2.76
Body-weight gain (pounds)	1.38	1.39
Mean egg weight (ounces)	2.08	2.09
Large & extra-large eggs (%)	54.1	56.2

The next year the test was repeated using 14 strains and 4,300 birds. Except that the metabolizable energy was 5 kcal./lb. lower in the control ration and 40 kcal./lb. lower in the all-plant ration, the diets were the same as in the previous year's test. In the second test, the number of eggs per bird (on a hen-housed basis) was slightly lower and the feed consumption slightly higher for the pullets fed the all-plant ration, but in all other respects the performance was alike. As in the previous year's test, no significant strain x ration interaction appeared.

During the 1967-68 laying year, 15 strains (3,200 birds) of laying pullets were fed either a high-protein or a low-protein all-plant diet. Except for the protein sources, all other ingredients of the rations were identical. The data show that with few exceptions all strains laid at a higher percentage on the high protein diet although the difference in the other variables, including the percentage of large and extra-large eggs, was insignificant.

The three tests (1) indicated that an all-plant ration containing adequate amounts of essential amino acids will give normal laying-house performance; and (2) provided no evidence that laying hens respond to unknown factors contained in animal products or that lack of animal products adversely affects the protein quality of the laying ration.

6.38 (0.4) AN IMMUNOCHEMICAL STUDY OF THE SURFACES OF SPONGE CELLS

MacLennan, Alastair P. (Microbiological Research Establishment, Porton, Nr. Salisbury, Wilts., United Kingdom)
Journal of Experimental Zoology 172, No. 3, 253-266 (November 1969)

Cell suspensions prepared from the siliceous sponges Halichondria panicea, Hymeniacidon perleve, Suberites (Ficulina) ficus, Cliona celata (gamma stage), and Pachymatisma johnstonii and from the calcareous sponge Grantia compressa and containing from 4 to 6 mg. N/ml. and 10,000 units/ml. of penicillin and streptomycin were emulsified with an equal volume of Freund's complete adjuvant. The antigen preparations, when injected in 1 ml. doses into rabbits, induced the formation of specific agglutinating antibodies. Cells of each species were shown by cross-agglutination and cross-absorption tests to possess species-specific antigenic determinants on their surfaces. The antigenic and, by implication, chemical differences between sponge cells that differ in aggregation specificity are discussed. [1 figure, 8 tables, 61 references]

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Sharma, Gurdial Mal, Baldev Vij, and Paul R. Burkholder (Lamont Geol. Observ., Columbia Univ., Palisades, N.Y.)
Chemical Abstracts 72, No. 15, 76126e (April 13, 1970)

6.38 (0.4) ANTIMICROBIAL SUBSTANCES OF SPONGES. III. CHEMICAL PROPERTIES OF SOME ANTIBACTERIAL COMPOUNDS FROM MARINE SPONGES

5.7 (0.32) IN VITRO HEMOLYSIS AS RELATED TO RAT ERYTHROCYTE CONTENT OF α-TOCOPHEROL AND POLYUNSATURATED FATTY ACIDS

Bieri, J. G., and R. K. H. Poukka (Laboratory of Nutrition and Endocrinology, National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Bethesda, Maryland 20014)
Journal of Nutrition 100, No. 5, 557-564 (May 1970)

The purpose of this study was to relate the amount of α-tocopherol required in rat erythrocytes for prevention of hemolysis in vitro to their polyunsaturated fatty acid (PUFA) composition. Red cells of varying PUFA and α-tocopherol contents were produced in rats and their hemolysis by dialuric acid determined. The erythrocyte concentration of α-tocopherol required to prevent significant hemolysis ranged from 122 μg/100 ml packed cells when the peroxidizable index (PI) of the PUFA was lowest (linoleic acid-free diet), to 196 μg/100 ml when the PI was highest (5% corn oil in the diet). The average ratio μmoles α-tocopherol/μmole PUFA to prevent 10% hemolysis was 0.00089, or one molecule of α-tocopherol per 1100 molecules of PUFA. Over a wide range of blood α-tocopherol concentrations, the erythrocyte content was about 0.45 of that in plasma. [4 figures, 4 tables, 20 references]

Authors' abstract

6.195

(added at the expense of 5 percent of the ground corn). The composition of the diets is tabulated below; vitamin-mineral supplements are not included.

Basic ingredients	Diets in Experiment			
	1		2	
	S	C	S	C
	percent			
Ground corn	72.0	30.7	65.2	34.7
Rolled wheat		12.0		25.0
Oat groats		10.0		5.0
Soybean Meal (50% protein)	24.0	27.0	25.0	12.0
Fish meal (64% protein)				5.0
Dry skim milk (33% protein)		15.0		10.0
Corn oil		2.0	4.0	4.0

The results showed that glucose did not improve the early weaning performance of the pigs; rather, it increased the incidence of diarrhea and decreased the gain. None of the experimental factors affected feed intake. The interaction between all three factors for gain was significant: adding glucose to the simple diet increased the gain of gilts but decreased the gain of boars; the opposite effect was caused by feeding the complex diet. Crumbling improved performance of pigs fed the simple diet; it had the opposite effect on pigs fed the complex diet. Boars consumed less feed per unit of gain than gilts did. Overall, the complex diets produced improved gain and feed efficiency.

The diets fed in the second experiment were isonitrogenous and isocaloric and contained similar levels of lysine, tryptophan, and sulfur amino acids, yet the complex diet produced faster gains. From this the authors conclude that the advocacy of feeding complex diets is justified, particularly if they are in meal form and do not contain added sucrose. The reviewer adds, however, that there is little or no reason to continue feeding them after the pigs have reached a weight of 25 or 30 lb. [3 tables]

6.54 (7.80) EFFECTS OF STARCH ON THE TEXTURE OF KAMABOKO

Kaneko, Yūzō, Takeshi Ito, Osamu Takagi, and Kiyoshi Fukushima (Central Research Laboratories, Ajinomoto Co., Inc., Kawasaki, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 1, 88-95 (January 1970) (In Japanese; figures, tables, and summary in English)

The authors describe a study of the effect of starch, an important constituent of kamaboko, on the physical properties of the kamaboko. Specimens containing from 2.5 to 40 parts starch and from 10 to 160 parts water to 100 parts frozen fish paste were prepared. The breaking stress and the breaking strain of each were measured with a gelometer, and the texture (toughness, brittleness, and overall evaluation) was judged by sensory test. At higher concentrations of starch, the stress value increased and the strain value, after an initial increase, gradually decreased. At higher concentrations of water, the stress value decreased rapidly, whereas the strain value decreased gradually. Three graphs are given showing each of the three texture variables as a function of stress and strain. [8 figures, 4 tables, 18 references]

LB

7.1 GEL PERMEATION CHROMATOGRAPHY

Bly, Donald D. (Physical and Analytical Division, Central Research Department, E. I. du Pont de Nemours & Co., Wilmington, Delaware)
Science 168, No. 3931, 527-533 (May 1, 1970)

Polymer chemists and biochemists have long sought means of measuring molecular weight, molecular weight distribution, and the composition distribution of a material. Several methods, many involving fractionation, have been developed, but they are tedious and time-consuming and yield fractions that are not especially narrow in molecular weight or in composition distribution. Automated, analytical gel permeation chromatography (GPC) is a rapid and generally quantitative method for determining the size distribution of polymer molecules. GPC tests will yield information on the molecular weight distribution or composition distribution, or both, from the size separation of molecules. The method reduces the time required for manual separation from weeks to a few hours' work.

This article discusses the principles, mechanisms, calculations, and applications of GPC.

GPC is used for preparative and analytical fractionation of macromolecules and has many applications. These applications include the study of: single crystals for their molecular weight distribution, the milling of natural and synthetic rubbers, and solid propellant binders for rocket engines. It has been used for the isolation of enzymes, the separation of various hormones, preparative-scale separations of serum proteins, the sorting of nucleic acids, and the separations of various viruses and carbohydrates.
[7 figures, 2 tables, 65 references]

FTP

6.54 SOLUBILIZATION OF FISH PROTEIN CONCENTRATE.
1. AN ALKALINE PROCESS

Tannenbaum, S. R., M. Ahern, and R. P. Bates (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139)
Food Technology 24, No. 5, 96-99 (May 1970)

The purpose of this study was to develop a process for the solubilizing of fish protein concentrate so that the concentrate could be used in a variety of prepared food products. Solubilization was accomplished by heating 7.5 to 10 g. of fish protein concentrate in 100 ml. of 0.2N NaOH at 95° C. for 20 min. The final product contained about 70 to 80 percent total solids and showed a pH of about 12.5. The solubilized fish protein concentrate consisted of large peptides or proteins, some of which were relatively insoluble at their isoelectric point. The product was light brown and had a slightly fishy odor. Extensive racemization of constituent amino acids took place. Although no chemical destruction of tryptophan and methionine took place, the concentration of L-methionine decreased significantly. [6 figures, 3 tables, 13 references]

FTP

7.51 STUDIES ON MUSCULAR PROTEINS OF FISH.

Takashi, Reiji, Ken-ichi Arai, and Tsuneyuki Saito (Laboratory of Biochemistry, Faculty of Fisheries, Hokkaido University, Hakodate, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 2 (February 1970) (In Japanese; figures, tables, and summaries in English)

I. PREPARATION OF MYOSIN FROM CARP MUSCLE. pp. 165-168.
Using the original method of Connell (1960), the authors prepared myosin from carp muscle as follows:

Step 1. Coarsely minced dorsal muscle of carp, 25 g.
washed three times with phosphate buffer, pH 7.5, $I = 0.05$.
centrifuged at 3,000 g. for 10 min.

Step 2. Residue
extracted with three volumes of 0.47 M KCl-49 mM KH_2PO_4-17.6 mM Na_2HPO_4-5 mM $MgCl_2$-5 mM ATP, pH 6.4, for 7 min. at 0° C.
centrifuged at 8,000 g. for 15 min.

Step 3. Supernatant
filtered through gauze.

Step 4. Filtrate
filuted by slow addition of 10 volumes of cold water.
centrifuged at 6,000 g. for 10 min.

Step 5. Precipitate
dissolved into 0.6 M KCl.

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7.8 (7.591) DIFFERENTIATION BETWEEN FRESH AND FROZEN MINCED BEEF

Stalder, B.
Fleischwirtschaft 49, 1345 (1969)

The author modified Hamm and Koermedy's method of differentiation between fresh and thawed-out frozen meat for use on minced meat. The basic method involves electrophoretic separation of the expressed meat juice and subsequent chromatographic detection of isozymes. The modification for use on minced meat consists in pretreating the minced meat by washing it in a detergent before the press juice is extracted. Two isozymes are indicated in the electrophoresis strips for fresh minced meat but only one for the frozen meat. FTP

6.54 (9.5) THE DEVELOPMENT OF FISH PROTEIN CONCENTRATE -- A STORY OF RESEARCH VERSUS POLITICS

Chapman, Wilbert McLeod (Marine Resources, Ralston Purina Co., San Diego, California 92106)
Research Management 13, No. 3, 209-220 (May 1970)

This article is an account of the main technical and political problems involved in the United States' efforts to develop fish protein concentrate from whole fish for direct human consumption. [8 references] FTP

7.51 (1.31) ISOLATION AND AMINO ACID SEQUENCE OF NEUROHYPOPHYSEAL HORMONES OF PACIFIC CHINOOK SALMON (ONCORHYNCHUS TSCHAWYTSCHA)

Wilson, Nadine, and Michael Smith (Fac. Med., Univ. British Columbia, Vancouver, British Columbia)
Chemical Abstracts 72, No. 13, 63992g (March 30, 1970)

6.54 FISH PASTE

Japanese Patent 27707/69
Yasuda Shoten K.K. (pat.)
Food Technology 24, No. 5, 62 (May 1970)

Fish paste is covered with a film of heat-resistant resin then steam cooked. FTP

7.593 EXTRACTION OF NUCLEIC ACIDS IN FISH MUSCLE AND LIVER
(1.125)(1.69) WITH PHENOL
(3.2495)

Uchiyama, Hitoshi, and Shigeo Ehira (Tokai Reg. Fish. Res. Lab., Kachidoki, Chuo-ku, Tokyo) and Nobukuni Tsuchiya (Tokyo Teion Reizo Co. Ltd., Kachidoki, Chuo-ku, Tokyo)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 1, 74-82 (January 1970)

Although biochemical problems associated with nucleic acids in living cells have been studied extensively, postmortem biochemical changes that take place in the nucleic acids from fish tissues are still obscure. To throw light on the relation between the freshness of fish and these changes, the authors considered it necessary to establish a procedure for extracting nucleic acids in an undegraded form. Using the muscle and liver of skipjack (Katsuwonus pelamis) and the muscle of plaice (Paralichtys olivaceus), they applied the phenol method that is widely employed for extracting nucleic acids from microorganisms.

The ribonucleic acid (RNA) and the deoxyribonucleic acid (DNA) were concentrated in the aqueous phase (which was separated from the phenol layer) and were extractible in an undegraded form when such nuclease inhibitors as bentonite and potassium polyvinylsulfate were used throughout the extraction procedure. The chromatograms of the nucleic acids thus extracted (on methylated bovine serum albumine kieselgur column) showed the three peaks--s-RNA, DNA, and r-RNA--that chromatograms of spores of Bacillus subtilis and Escherichia coli strain B show. The two r-RNA components corresponded to the 16 S and 23 S subunits reported by Doi et al. in 1964. Those from skipjack muscle and liver, like those from the

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7.81 SIGNIFICANCE IN MEASURING VOLATILE BASE AND TRIMETHYLAMINE NITROGEN AND NUCLEOTIDES IN FISH MUSCLE AS INDICES OF FRESHNESS OF FISH

Uchiyama, Hitoshi, Shigeo Ehira, and Hiroshi Kobayashi (Tokai Reg. Fish. Res. Lab., Chuo-ku, Tokyo, Japan) and Wataru Shimizu (Fish. Agric. and Vet., Nihon Univ., Setagaya-ku, Tokyo)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 2, 177-187 (February 1970) (In Japanese; figures, tables, and summary in English)

The values for volatile base nitrogen (VBN) and trimethylamine nitrogen (TMAN) have been widely accepted as a measure of the freshness of fish. However, few data are available on the relation between these values and commercially evaluated freshness. Therefore the authors determined the VBN value, the TMAN, the content of adenosine triphosphate (ATP) and its related compounds (inosine + hypoxanthine, inosine monophosphate, adenosine monophosphate, and adenosine diphosphate + ATP), and the K value (the nucleotide decomposition ratio) for five uncooked Japanese seafoods. These seafoods were as follows: 27 samples of author-prepared sashimi (sliced raw fish) made from four species of good-quality tuna bought at the Tokyo Central Fish Market; 15 samples of author-prepared sashimi made from fish killed immediately after being caught; 12 samples of sashimi bought at local fish-retail shops; 28 good-quality condiments to be used on sushi (a roll of vegetable or meat, or both, wrapped in layers of seaweed and rice), bought at local restaurants; 33 medium-quality sushi condiments bought at a sushi restaurant. The bacterial counts for the sushi condiments were also determined.

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7.80 ORDER EFFECTS IN TASTE TESTS

Berdy, David (Esso Petroleum Co.)
Journal of the Marketing Research Society 11, No. 4, 361-371 (October 1969)

The author examined some features of the order effect phenomenon in taste tests and shows that this bias is associated with aspects of test design that are relatively easy to correct. In the context of this report, the term "taste tests" refers to personal preference tests in which informants indicate which of two products they like more. Data for this paper were drawn from 6 taste tests with 12 cakes and breakfast cereals. The 12 products were tested in 24 order arrangements and the author found that in two-thirds of the cases preferences went to the product that was sampled first.

The author resolved the problem of order effect bias by a sample rearrangement of the test design. The idea is to present the products side by side rather than separately and allow the testers to try them in whichever order and as many times as they like. The advantage of this method (of repeat testing) is that each product in turn becomes a yardstick for evaluating the other. The disadvantages of the system seem to be that small differences between products may become overemphasized and that simultaneous testing of strongly flavored products may produce some distortions in the results. However, the author considers these two drawbacks minor.
[5 tables, appendix with 4 tables, 18 references]

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7.85 THE MICROBIOLOGICAL WHOLESOMENESS OF SPACE FOODS
(0.5)

El-Bisi, Hamed M., and Edmund M. Powers
Technical Report, Army Natick Laboratories, Massachusetts Food Laboratory, 33 pp. (1969)
U.S. Government Research and Development Reports 70, No. 8, 53 (April 25, 1970) Available from the Clearinghouse for Federal Scientific and Technical Information, U.S. Department of Commerce, Springfield, Virginia 22151. Order No. AD-701 861. Price $3.00.

The microbiological requirements for space foods were established in 1964 to safeguard the health of the astronauts during a space mission. These requirements are: the total aerobic plate count shall not exceed 10,000 per gram; the total coliform count shall not exceed 10 per gram; the fecal coliforms shall be negative in 1 gram; the fecal streptococci shall not exceed 20 per gram; the coagulase positive staphylococci shall be negative in 5 grams; and the Salmonellae shall be negative in 10 grams of food. The report discusses the scientific and technical rationale behind these microbiological requirements. These requirements and the methodology prescribed for determining compliance therewith are documented.

Authors' abstract in part

7.80 ATTEMPTS AT QUANTITATING FLAVOR DIFFERENCES

Hirsh, Naomi L. (The Coca-Cola Company, Foods Division, Houston, Texas)
Food Product Development 4, No. 2, 22-23, 26 (April 1970)

One problem often encountered in flavor-difference testing by taste panels is the evaluation of the magnitude or the amount of perceptible difference between variables. The purpose of this article is to show that quantifying flavor differences is not an easy task.

In earlier tests in the author's laboratory, it was common practice to have taste panelists rate the amount of difference between variables on some sort of scale printed on the questionnaire. The results of the tests, however, showed that this rating method, used without standards, is completely unreliable.

In an attempt to improve their method of flavor-difference testing, the author carried out a series of tests using instant coffee as the test product. Twenty experienced, though not necessarily expert, panelists were used. Three different questionnaires were used. Duplicate triangle tests were conducted.

She found that the degree of difference scaling, without the presence of standards and (or) extensive training, adds little information to difference test data, regardless of the type of scale used. The proportion of the panels that correctly discriminate the difference appears to provide the most meaningful information.

The "in-house" panelists used for testing flavor difference should be restricted to simple discrimination tests such as triangle, duo-trio, or paired comparison tests. In techniques using replicate pairs, no more than two pairs per session should be used. [3 figures, 5 tables]

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bacterial spores, were easily resolved on the column; the r-RNA subunits from plaice muscle were not.

In a report to be published later, the authors extend their investigation to cover changes that occur during ice storage in the nucleic acids of these two and four additional fish species. Although they suggest that more work must be done to learn in detail the relation between the mode of degradation of nucleic acids and the freshness of fish, they believe that s-RNA, DNA, and r-RNA molecules denature or deform during ice storage. They conclude that the isolation method described in the present study can be used in the work.

[8 figures, 1 table, 21 references]

7.597 (7.874) THIN-LAYER CHROMATOGRAPHIC IDENTIFICATION OF FORMALDEHYDE IN AQUATIC ANIMALS

Harada, Katsuhiko, Shigetsugu Miura, Yoshio Shinoda, and Kinjiro Yamada (The Shimonoseki University of Fisheries, Shimonoseki, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 2, 188-191 (February 1970) (In Japanese; figures, table, and summary in English)

Food microbiologists are increasingly concerned with microorganisms in foods that have received some type of processing or preservation treatment. Although the microorganisms that survive such treatment may be injured, they may persist for some time before they die. Some, apparently, persist for the entire life of the food product. Moreover, there is always the possibility that the injured cells may recover, particularly if the food they are in is mixed with other foods. Increasing evidence points to the fact that food-borne pathogens retain their pathogenicity even though they are injured. Thus it is increasingly important to have a means of detecting injured as well as uninjured microorganisms that may be present in foods. One of the most pressing problems in this regard is to find a means of resuscitating an injured microorganism so that it can be detected selectively during the quantitative or qualitative examination of foods.
[40 references]

LB

7.86 SELECTIVE CULTURE OF SPOILAGE AND INDICATOR ORGANISMS

Speck, M. L. (Department of Food Science, North Carolina State University, Raleigh 27607)
Journal of Milk and Food Technology 33, No. 4, 163-167 (April 1970)

Food microbiologists are increasingly concerned with microorganisms in foods that have received some type of processing or preservation treatment. Although the microorganisms that survive such treatment may be injured, they may persist for some time before they die. Some, apparently, persist for the entire life of the food product. Moreover, there is always the possibility that the injured cells may recover, particularly if the food they are in is mixed with other foods. Increasing evidence points to the fact that food-borne pathogens retain their pathogenicity even though they are injured. Thus it is increasingly important to have a means of detecting injured as well as uninjured microorganisms that may be present in foods. One of the most pressing problems in this regard is to find a means of resuscitating an injured microorganism so that it can be detected selectively during the quantitative or qualitative examination of foods.
[40 references]

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The results showed that the values for VBN and TMAN in all the seafoods were distributed randomly. No trends could be discerned; only the limits of acceptability and the onset of spoilage could be estimated. The K value, however, was found to be a useful index of the organoleptic freshness of fish-market products.
[2 figures, 6 tables, 20 references]

7.590 USE OF MOLECULAR SIEVE 5A IN THE ANALYSIS OF THE FLAVOUR VOLATILES OF COOKED CHICKEN

Frohock-Hobson, A. (Agricultural Research Council, Food Research Institute, Colney Lane, Norwich, NOR 70F, England)
Journal of the Science of Food and Agriculture 21, No. 3, 152-155 (March 1970)

The author used a short column of molecular sieve 5A to simplify the complex pattern of flavor volatiles extracted by isopentane from cooked meat prior to analysis by gas-liquid chromatography and identification by mass spectrometry. The molecular sieve 5A removed all components from the mixture except aromatic hydrocarbons, branched cyclic compounds, and some halogenated derivatives. In recovery experiments, no loss of aromatics occurred on the sieve and n-alkanes, n-alkanals, n-alkanones, n-alkanols, and fatty acid methyl esters were completely removed. Some n-alkanes were recovered from the molecular sieve 5A by displacement with hexadecane. [1 figure, 1 table, 20 references]

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7.89 (3.15)(1.85) APPARENT VISCOSITY OF SHRIMP HOMOGENATE AS A QUALITY INDEX OF SHRIMP IRRADIATED AT CRYOGENIC TEMPERATURES

Rhee, Joon Shick (Louisiana State University, Baton Rouge, La.)
Thesis, 102 pp. (1969)
Nuclear Science Abstracts 24, No. 6, 1961 (March 31, 1970)

In this study the author examined the panel's usefulness of several physiological tests for evaluating the quality and freshness of irradiated shrimp. FTP

7.879 (9.3) CURRENT STATUS OF THE TMA TEST AS A MEASURE OF SPOILAGE IN FISH

Castell, C. H. (Fisheries Research Board of Canada, Halifax, Nova Scotia)
Fisheries of Canada 22, No. 9, 16-20 (April 1970)

In the summer of 1969, the Food and Agriculture Organization of the United Nations held a week-long conference in Halifax on fish inspection and quality control. One of the subjects that received considerable attention was the use and limitations of the TMA (trimethylamine) test as a measure of spoilage in fish. A complete report on the analytical methods used for measuring TMA and the best procedures for sampling fish will be available when the proceedings of the conference are published. In the meantime, the author felt it worthwhile to summarize some of the more recent ideas regarding the TMA test and, particularly, to point out those areas where its value is questionable or needs reinterpretation.

Some of the misunderstanding regarding TMA as a measure of spoilage is basically the result of an over-simplification of a relation that is quite complex. The reasoning, briefly, is that sea fish contain TMAO (trimethylamine oxide) and, since TMAO is broken down by bacteria to form TMA, measuring the amount of TMA in the fish muscle will give a fairly good indication of the extent of bacterial deterioration that has occurred. There are several weaknesses in this reasoning. It applies only to certain species of fish--and only if these fish have not been treated with a preservative, such as sodium nitrite, or one of the antibiotics. There are mechanisms other than bacteria by which TMAO can be broken down: an enzyme in the red muscle of certain pelagic fish or in the pyloric cecum of some other fish; trace amounts of certain heavy metals, the activity of which is

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7.9 (3.4) EXTRACTION AND GAS CHROMATOGRAPHIC DETERMINATION OF N-NITROSODIMETHYLAMINE IN SMOKED FISH: APPLICATION TO SMOKED NITRITE-TREATED CHUB

Howard, John W., Thomas Fazio, and James O. Watts (Division of Food Chemistry and Technology, Food and Drug Administration, USDHEW, Washington, D.C. 20204)
Journal of the Association of Official Analytical Chemists 53, No. 2, 269-274 (March 1970)

Nitrites and nitrates may be used as preservatives and color fixatives in smoked fish (sable fish, shad, salmon, and tuna fish) and in smoked meats under limitations prescribed in Federal food additive regulations (CFR 121.1063 and CFR 121.1064). A more recent regulation, CFR 121.1230, deals with the use of sodium nitrite in combination with salt to inhibit growth of toxin formation of Clostridium botulinum, type E, in smoked chub fish. The safety of the use of nitrites and nitrates in smoked fish has been questioned because of the possible formation of carcinogenic N-nitrosoamines after treatment of the fish with nitrite, nitrate, or both, and then reaction with the amines that occur naturally in the fish.

The use of nitrite in the processing of smoked fish, under certain conditions, inhibits the growth of C. botulinum, type E. However, before regulations concerning the use of nitrites in smoked fish could be issued, information was needed on whether dimethylnitrosoamine (DMNA) (a carcinogenic agent) was formed under the conditions of the proposed treatment. The purpose of this study was to develop an accurate and sensitive method of analysis for DMNA.

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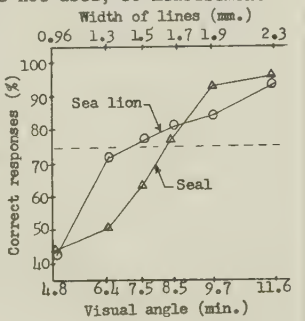
7.9 (9.125)(1.951) (1.952) VISUAL ACUITY OF THE HARBOUR SEAL AND THE STELLER SEA LION UNDER WATER

Schusterman, Ronald J., and Richard F. Balliet (Stanford Research Institute, Menlo Park, California)
Nature 226, No. 5245, 563-564 (May 9, 1970)

Experiments in 1968 by the senior author and in 1965 by Riggs on the visual acuity of pinnipeds under water were largely unsuccessful--the animals could not be kept at a minimum distance from the stimuli, so the visual angle could not be calculated accurately, and stimulus configurations were not used, so measurements of visual resolving power were contaminated by intensity discriminations. The present report describes experiments in which these deficiencies are corrected.

Using a white oval tank, the authors measured the response to acuity targets of a 4-yr.-old male Steller sea lion (Eumetopias jubata) and a 5-yr.-old male harbor seal (Phoca vitulina). The targets were 5-in.^{2} photographs of Ronchi rulings, the stripes being within 0.001 in. of equal width. The target with the standard grating had lines 0.05 mm. wide, and the reward targets--those with the variable gratings--had lines from 0.96 to 25.4 mm. wide. Visual acuity was specified in terms of the angular width of the stripes of the finest grating the animals could resolve (see figure).



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8.42 (0.7) INORGANIC ELEMENTS IN FOODS USED IN HOSPITAL MENUS

Gormican, Annette (Departments of Medicine and Nutritional Sciences, University of Wisconsin, Madison, Wisconsin)
Journal of the American Dietetic Association 56, No. 5, 397-403 (May 1970)

The article contains data on the inorganic element content of 128 foods purchased and utilized in hospital menu planning. The food groups analyzed were: beverages and dietary concentrates; breads, cereal products, crackers, and pastas; eggs and dairy products; fruits and fruit juices; meat, poultry, fish, and shellfish; nuts; sugars and flours; and vegetables.

For some foods, the iron values were much lower than the values reported in the literature. Copper values of diet composites (representing summer and winter menus) were far below estimations of daily intake. The trace element composition of the general diet varied considerably from the previously estimated average daily human consumption of these elements. Data for fishery products are shown in the following table.

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The evidence of these tests is consistent with findings reported previously: pinnipeds' large spherical lenses compensate for the loss of the refractive power of the cornea under water. Indications are that their vision compares favorably with that of the sharper-eyed land mammals. Water turbidity, however, may limit their visually guided feeding behavior. The authors conclude that these results, in conjunction with conclusions drawn by earlier investigators, raise the reported visual resolving power of pinnipeds to question. They wonder if the same criticism would not apply to experiments on the visual acuity of cetaceans. [1 figure, 11 references]

7.879

greatly increased by the presence of cysteine; hemoglobin and probably some of the other heme pigments; many chemical reducing agents, especially in heated, canned fishery products; gamma irradiation; and some still unidentified agents that arise during frozen storage. Finally, the over-simplification does not suggest that other products, particularly DMA (dimethylamine) may be formed. Thus TMA can be a good, a fair, or a completely useless measure of spoilage, depending on the conditions under which it is used and the ability of those using it to interpret the results they obtain.

During the convention, a Japanese fishery scientist read a paper suggesting that Dyer's method for measuring TMA (the most commonly used procedure) be modified to eliminate errors caused by the presence of DMA; he and his coworkers had found that, with Dyer's picric acid test, DMA gave a color reaction identical with that of TMA, making it impossible to tell whether TMA, DMA, or a mixture of the two was present. The modification involves use of potassium hydroxide rather than potassium carbonate as the alkalizing reagent, for under these conditions TMA but not DMA will react with the picric acid to give a color compound.

In light of this report and corroborative tests in his laboratory, the author speculates on the validity of all the data that have been accumulated by using the original Dyer test, and he strongly advocates paying less attention to one particular reaction (such as the breakdown of TMAO or the oxidation of lipids) and more to the wide spectrum of interrelated chemical changes that occur in deteriorating fish muscle. He ends by stating that, despite all these ramifications, the TMA test is one of the best available for following the development of spoilage in chilled and iced groundfish and is a very useful supplement in the grading of cod and haddock. [4 figures, 1 photograph]

8.42

Fishery food product	Inorganic element content in milligrams per 100 grams											
	P	K	Ca	Mg	Na	Al	Ba	Fe	Sr	B	Cu	Zn	Mg	Cr
Crab meat; canned, salted	147	265	25	41	500	<0.1	<0.02	0.48	0.37	0.01	0.27	3.6	<0.02	<0.03
Haddock; raw, frozen	164	370	10	24	202	<0.1	<0.02	1.4	0.031	0.021	0.011	0.32	<0.02	<0.03
Sockeye salmon; canned, salt-free	312	400	272	29	51	0.82	<0.02	1.4	1.0	0.064	0.076	1.1	<0.02	<0.03
Shrimp; canned, salted	141	163	18	23	2,300	<0.1	<0.02	1.6	0.17	0.022	0.17	1.9	<0.02	<0.03
Sole; raw, frozen	110	220	25	44	397	<0.1	<0.02	0.33	0.2	0.062	0.011	0.31	<0.02	<0.03
Tuna fish; canned, salt-free, water-pack	184	330	<5	23	44	<0.1	<0.02	3.2	<0.01	0.054	0.011	0.44	<0.02	<0.03

[2 figures, 15 references]

8.42 MINERAL COMPOSITION OF SOME FISHES IN THE ATLANTIC

Podsevalov, V. N., and T. I. Chemisova (U.S.S.R.)
Chemical Abstracts 72, No. 5, 19458p (February 2, 1970)

7.9

The author found that DMNA can be determined in smoked nitrite-treated chub as follows: The sample of fish is digested in methanolic potassium hydroxide; the nitrosoamine is distilled from the alkaline solution, further isolated by extraction and chromatographic techniques (GLC), and then determined by GLC with a modified thermionic detector. The recoveries of DMNA added at levels of 10 p.p.b. ranged from 70 to 86 percent. Five experimental lots of smoked nitrite-treated chubs were analyzed for DMNA by the method. The authors found that DMNA is not produced in the flesh of chubs under the processing and smoking conditions used. [3 figures, 1 table, 29 references]

3.4 (0.2) [PECULIARITIES OF SETTLING OF THE DISPERSION PHASE OF CURING SMOKE IN ELECTRIC SMOKING]

Sadovskii, B. F., V. V. Gavrilov, E. A. Khvan', and N. A. Voskresenskii (Nauchno-issled. Fiziko-khimicheskii Inst. im. L. Ya. Karpova, U.S.S.R.)
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya 1969, No. 3, 82-84 (1969)

Food Science and Technology Abstracts 2, No. 1, 126, Item 01R20 (January 1970)

The authors investigated the precipitation of the dispersed smoke particles in an electric field during the curing of small fish by determining the weight concentration of the curing smoke before and after it passed through the smoke box. They found that (1) the dispersion composition of the smoke remained unchanged; (2) the amount of smoke that settled increased linearly with the increase in the settling surface; and (3) the coefficient of useful exploitation of the dispersed smoke particles was unchanged if the batch of fish in the smoke box weighed more than 6 kg. [7 references]

[Extracter: LB]

8.53 FATTY ACIDS, CHOLESTEROL, AND PROXIMATE ANALYSES
(8.0)(8.59) OF SOME READY-TO-EAT FOODS
(0.7)

Standal, Bluebell R., David R. Bassett, Purification B. Policar, and Margaret Thom (Department of Food and Nutritional Sciences, Hawaii Agricultural Experiment Station, University of Hawaii, Honolulu)
Journal of the American Dietetic Association 56, No. 5, 392-396 (May 1970)

Presented here are data on cholesterol and fatty acid content of 22 commonly used prepared foods. The prepared foods examined were frozen chicken dinner, desserts (cake and pie), English muffin, tuna fish, macaroni salad, various meat products, mixed nuts, beef-vegetable soup, Spanish rice, tomato sauce, and frozen mixed vegetables.

The data show that prepared foods of the same name do not have the same nutrient values. The nutrient content is influenced by the state of dehydration, the types of fats and oils used in cooking, and the individual variations in food cookery. However, depending upon the purpose of a research investigation, approximations as to nutrient content of prepared foods may be permissible. Calculation of nutrient content from the raw ingredients to prepared foods is of limited value. Data on tuna fish products are given in the following tables.
[3 tables, 8 references]

(over)

9.11 FISHERIES OCEANOGRAPHY
(9.6)

Hela, Ilmo (Institute of Marine Research, Helsinki), and Taivo Laevastu (Oceanographic Research Division, Fleet Numerical Weather Central, Monterey, California)
Fishing News (Books) Ltd., 110 Fleet Street, London, E.C.4. 256 pp. (n.d.) £5.17.0 (including postage).
Fishing News, No. 2966, 8 (April 17, 1970)

This book, successor to the authors' Fisheries Hydrography, comprehends 10 years' progress in the acquisition of oceanographic data and their application for better weather forecasting and fishing success. It can be used by practical fishermen, administrators, and scientists alike. The nine chapters of the book are as follows:

Introductory (This chapter gives the specific aim of the book: to apply accumulated knowledge of ocean environments to fisheries and navigational problems so that catches will be better and operations more efficient.)

Philosophy and Principles of Applied Oceanography (There are four main ways of increasing catch per unit effort: improving fishing vessels, improving fishing gear, directing fleets to the best fishing grounds, and regulating the fisheries; of these, the easiest, cheapest, and most efficient is directing the fleets to the best grounds--accomplished through improved forecasting.)

(over)

8.59 STUDIES ON THE ACID-SOLUBLE NUCLEOTIDES IN THE MANTLE OF ABALONE
(9.13)(1.83)

Nishita, Kiyoyoshi (Fac. Fisheries, Hokkaido Univ., Hakodate, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 1, 68-73 (January 1970)

The author fractionated the acid-soluble nucleotides from the muscle of abalone (Haliotis discus hannai) by anion-exchange chromatography. Adenine; hypoxanthine; adenosine mono-, di-, and triphosphate; and uridine diphosphate-N-acetylgalactosamine and -N-acetylglucosamine were identified. The total amount of acid-soluble nucleotides found in the mantle (1.07 µmoles/g. of fresh tissue) was appreciably lower than the amount reported by the author in 1966 for the muscle (3.39 µmoles/g.) and the amount reported by Seki et al. in 1967 for the hepatopancreas (2.11 µmoles/g.). The high content of UDP-N-acetylhexosamine (22 percent) found in the mantle led the author to conclude that mucoproteins and/or mucopolysaccharides are actively synthesied in the tissue to secrete high viscous extrapallial fluid. [2 figures, 1 table, 6 references]

9.11 TEKTITE 1, MAN-IN-THE-SEA PROJECT: MARINE SCIENCE PROGRAM
(0.4)

Clifton, H. Edward (U.S. Geological Survey, Menlo Park, California), Conrad V. W. Mahnken and John C. Van Derwalker (U.S. Bureau of Commercial Fisheries, Biological Laboratory, Seattle, Washington), and Richard A. Waller (U.S. Bureau of Commercial Fisheries, Washington, D.C.)
Science 168, No. 3932, 659-663 (May 8, 1970)

The purpose of Project Tektite 1, a man-in-the-sea experiment, was to evaluate a sea-floor habitat as a research platform and to test the research capability of a small team of scientists over an extended period of submarine habitation under nitrogen-saturated conditions. Five scientists spent 60 days approximately 15 meters below the surface of the sea.

The experiment demonstrated the advantages of underwater habitation and saturation diving for biological and geological research. The greatest advantage is the opportunity for continuous monitoring of organisms or processes. Also, more research time underwater is possible by underwater habitation than by surface diving or intermittent bottom dwelling. The project also demonstrated that the scientist who lives in the sea does not have to have the extensive qualifications of a professional diver. [3 figures, 7 references] FTP

8.8 WATER CONTENT AND STABILITY OF LOW-MOISTURE & INTERMEDIATE-MOISTURE FOODS

Labuza, T. P., S. R. Tannenbaum, and M. Karel (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139)
Food Technology 24, No. 5, 35-36, 38-40, 42 (May 1970)

This paper discusses how water, through its solvent and reactant properties, affects important reactions involved in the stability of freeze-dried and intermediate-moisture-content foods. Through such properties, water influences the rate of chemical deterioration of foods, especially of lipid oxidation and of nonenzymatic browning. Other deteriorative reactions discussed are hydrolysis of sucrose, oxidative pigment changes, and changes in proteins exposed to oxidizing lipids. [14 figures, 24 references] FTP

[Extracter: LB]

The English, French, and German common names and the Latin scientific terms for four species of lobster and for shrimps and prawns are given. The author urges the use of correct nomenclature to describe fish products to be marketed.

8.8 SCHMACKHOFTE KREBSTIERE DES MEERES [TASTY CRUSTACEANS]
(1.80)

Keune, J. A.
Fettkosmetik 6, No. 10, 327-330 (1969)
Food Science and Technology Abstracts 2, No. 2, 280, Item 1[sic]R44 (February 1970)

8.53

Food product	Calories and nutrient per 100 grams of food product							
	Energy[3]	Water	Protein	Fat	Carbohydrate[4]	Fiber	Ash	Cholesterol
	calories	grams	grams	grams	grams	grams	grams	milligrams
Breaded and fried tuna[1]	192	58.6	30.2	6.7	2.8	0.15	1.6	79
Broiled tuna[1]	181	57.6	34.9	4.1	1.3	0.10	2.0	84
Creamed tuna[2]	229	63.6	10.8	18.0	6.1	0.11	1.4	91
Raw tuna	118	69.2	27.3	0.2	1.9	0.12	1.3	--
Smoke-dried tuna[1]	238	34.4	55.0	1.4	1.3	0.15	7.7	102
Sun-dried tuna[1]	253	33.9	53.5	3.1	2.7	0.13	6.6	92

1/ Made from fresh fish.
2/ Made from canned tuna in oil.
3/ Using factors of: protein-4, fat-9, and carbohydrate-4.
4/ Calculated by difference.

Food product	Fatty acid content in percent of total fatty acids[3]											
	Lauric	Myristic	Tetradecenoic	Palmitic	Palmitoleic	Stearic	Oleic	Linoleic	Linolenic	Docosenoic	Eicosapentaenoic	Docosahexaenoic
Breaded and fried tuna[1]	X	1.4	X	26.7	1.3	4.0	18.5	43.7	X	X	0.3	4.1
Broiled tuna[1]	X	4.5	X	30.3	4.5	9.1	18.6	3.3	X	2.0	4.4	23.5
Creamed tuna[2]	1.7	7.4	X	26.6	2.5	7.5	22.5	16.7	3.8	X	0.8	3.3
Raw tuna	X	2.5	X	33.6	2.2	11.0	15.8	1.8	X	0.8	3.7	28.7
Smoke-dried tuna[1]	X	3.8	X	43.0	5.1	14.3	27.8	2.4	X	2.0	X	X
Sun-dried tuna[1]	X	4.9	2.0	48.4	6.6	11.5	26.6	X	X	X	X	X

1/ Made from raw tuna.
2/ Made from canned tuna in oil.
3/ An X indicates quantity between 0 and 0.05.

9.12 THE FUNCTIONING OF THE FISHES
(9.6)

Gordon, Malcolm S. (Department of Zoology, University of California, Los Angeles) (reviewer)
Fish Physiology
W. S. Hoar and D. J. Randall (editors)
Academic Press, New York (1969)
Science 168, No. 3929, 356-357 (April 17, 1970)

Among the chapters of this six-volume work are those dealing with the general chemical composition of fishes and the interactions of fishes with environments either drastically changed or made by man. The reviewer points out that, even with substantial recent activity in the specific areas involved, several chapters provide many challenges for future research--the solution to such long-unresolved problems, for example, as the biochemical origin of trimethylamine oxide, the metabolic functions of neurohypophysial hormones, and the metabolic functions of thyroxin. Each volume has an author, a subject, and a systematic index.

The following volumes are now available:

Volume 1, Excretion, Ionic Regulation, and Metabolism. xiv + 466 pp. $23 (by subscription, $18)
Volume 2, The Endocrine System. xiv + 448 pp. $23 (by subscription, $19.55)
Volume 3, Reproduction and Growth, Bioluminescence, Pigments, and Poisons. 502 pp. $24 (by subscription, $20).

LB

9.11

Effects of Environment on Fish Behaviour and Abundance (This chapter revises and updates Fisheries Hydrography; it includes many new tables and 23 illustrations.)

Oceanographic Analyses and Forecasts (The main sections are: space and time scales and hydrocline data, speed and magnitude of short-term changes in the ocean, and synoptic oceanographic analyses and forecasting.)

Data Processing, Storage and Retrieval (This chapter describes the numerical chart system and gives its advantages--objectivity, speed, and accuracy.)

Some Applications of Environmental Analyses/Forecasts to Fisheries (This chapter gives practical proof of the successful application of forecasts to specific fisheries.)

Submarine Acoustics in Fisheries and Its Dependence on Environment (This detailed chapter is divided into eight sections; it has 28 illustrations.)

Types and Organizations of Environmental Services in Fisheries, Navigation and Navies (From knowledge accumulated over the past 50 years, information directly applicable to forecasting must be screened, interpreted for the specific requirements of particular fisheries, summarized, and distributed.)

Some Problems in Fishing Oceanography (This chapter was written by Dr. William M. Chapman.) [122 figures]

9.12 AERIAL VISION: UNIQUE ADAPTATION OF AN INTERTIDAL FISH

Graham, Jeffrey B., and Richard H. Rosenblatt (Scripps Institution of Oceanography La Jolla, California 92037)
Science 168, No. 3931, 586-588 (May 1, 1970)

For visual accommodation in water, fish rely solely on the movement of the round crystalline lens of the eye. The cornea, because its refractive index is the same as that of water, does not function in the formation of an image. In air, the vision of fish becomes myopic because the refractive power of the cornea is added to that of the lens.

The Mnierpes macrocephalus inhabits the rocky shores of the tropical east Pacific and relies on aerial vision for feeding and orientation in its habitat. Also, it makes frequent terrestrial sojourns. The eye of the Mnierpes has two flattened corneal surfaces that facilitate aerial vision--the use of a flat cornea to facilitate acute aerial vision represents a previously unknown adaptation in fishes. [2 figures, 8 references]

9.13 (9.19) EFFECTS OF SUBLETHAL DDT ON A SIMPLE REFLEX IN BROOK TROUT

Anderson, J. M., and H. B. Prins (Fisheries Research Board of Canada, Biological Station, St. Andrews, New Brunswick)
Journal of the Fisheries Research Board of Canada 27, No. 2, 331-334 (February 1970)

Fish that have been exposed to very low doses of DDT [1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane] may seem perfectly normal to the casual observer, but experiments have revealed profound physiological and behavioral disturbances. Changes that have been observed in fish by various researchers relate to temperature selection, lower lethal temperature, lateral line function, spontaneous electric activity of the cerebellum, and the cold-blocking temperature of a simple reflex.

The present study deals with the effect of sublethal doses of DDT on the conditioned response involving an excremely simple reflex--the propeller-tail reflex. The authors reasoned that the greatly reduced complexity of the sensory and motor apparatus required for the fish to exhibit this response would make any changes in the rate of learning much more likely to be a function of the central nervous system.

Brook trout (Salvelinus fontinalis) were conditioned to exhibit the propeller-tail reflex, with electric shock as the unconditioned stimulus and light as the conditioning stimulus. More than half of the trout exposed for 24 hours to sublethal amounts of DDT (20 p.p.b.) could not be conditioned; the remainder

(over)

9.13 SEASONAL VARIATIONS IN THE METABOLIC ACTIVITIES OF TISSUE CONSTITUENTS OF SOME FISHES-- 1. CHANGES IN NUCLEIC ACID CONTENTS OF SOME TISSUES OF KOKANEE SALMON, ONCORHYNCHUS NERKA F. KENERLYI

Imura, Koji, and Tsuneyuki Saito (Laboratory of Biochemistry, Faculty of Fisheries, Hokkaido University, Hakodate, Japan)
Bulletin of the Faculty of Fisheries Hokkaido University 20, No. 3, 202-210 (November 1969) (In Japanese; figures, table, and summary in English)

The seasonal variations in the nucleic acid content and the weight of the liver, kidney, spleen, heart, pyloric caeca, and muscle of kokanee salmon were determined. The ribonucleic acid (RNA) in all these tissues decreased during the spawning season. Normally the RNA in the liver of females was from 1.5 to 2 times as much as that of males; during the spawning season, however, the RNA in both sexes decreased to a common level. The authors theorize that the seasonal variations in the weight of the liver and the pyloric caeca were independent of increasing and decreasing cell numbers.
[16 figures, 1 table, 11 references]

9.13 (1.89) STUDIES ON THE METABOLISM OF PENTACHLOROPHENATE, A HERBICIDE, IN AQUATIC ORGANISMS

Kobayashi, Kunio, and Hiroshi Akitake (Lab. Fish. Chem., Fac. Agr., Kyushu Univ., Fukuoka, Japan) and Tetuo Tomiyama (Tokyo Univ. of Fisheries, Tokyo)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 1 (January 1970) (In Japanese; figures, tables, and summaries in English)

II. BIOCHEMICAL CHANGE OF PCP IN SEA WATER BY DETOXICATION MECHANISM OF TAPES PHILIPPINARUM, pp. 96-102.

In 1962, the senior author and his coworkers discovered that the concentration of pentachlorophenate (PCP) in sea water sharply decreased when Tapes philippinarum were cultured in the water. The amount of PCP that accumulated in the shellfish, however, was smaller than the amount that was lost from the water; moreover, the PCP content in the shellfish decreased as culture time increased. In the present paper, the authors examine the biochemical change of ^{14}C-labeled PCP in sea water during the culture of T. philippinarum. They found that the decrease of PCP in the medium reflected not a decomposition but rather a transformation to some bound form by the detoxication mechanism of the shellfish. The excreta of the shellfish and of the microorganisms in the water had no part in the formation of the bound PCP. Although the bound PCP was not extracted from the acidified aqueous solution (0.02 N HCl) by Tomiyama's method for PCP determination (1963), the free PCP was determined from the distillate of the steam-distilled acidified sample (0.6 N HCl). [3 figures, 4 tables, 10 references]

(over)

9.13 SEASONAL VARIATIONS IN THE METABOLIC ACTIVITIES OF TISSUE CONSTITUENTS OF SOME FISHES--II. ACID-SOLUBLE NUCLEOTIDES AND RELATED COMPOUNDS IN THE LIVER OF KOKANEE SALMON

Seki, Nobuo, Toshio Kanaya, and Tsuneyuki Saito (Laboratory of Biochemistry, Faculty of Fisheries, Hokkaido University, Hakodate, Japan)
Bulletin of the Faculty of Fisheries Hokkaido University 20, No. 3, 211-216 (November 1969) (In Japanese; figures, tables, and summary in English)

Using anion-exchange chromatography, the authors investigated the free nucleotides and related compounds contained in the liver of kokanee salmon (Oncorhynchus nerka) in June, October, and November. They detected the following compounds: adenine, adenosine, guanosine, hypoxanthine, inosine, nicotinamide, adenosine 5′-monophosphate, adenosine 5′-diphosphate, adenosine 5′-triphosphate, inosine 5′-monophosphate, uridine 5′-monophosphate, uridine 5′-diphosphate (UDP), uridine 5′-diphosphate-N-acetylhexosamine, uridine 5′-diphosphate hexose, uridine 5′-diphosphate uronic acid, nicotinamide adenine dinucleotide, nicotinamide adenine dinucleotide phosphate, adenosine diphosphate ribose, adenosine triphosphate ribose, and guanosine 5′-monophosphate. The patterns given by these nucleotides in different months resembled not only one another but also the patterns given by nucleotides obtained from the liver of other fishes. The content of total adenine nucleotides, based on the content of deoxyribonucleic acid, increased gradually until spawning time. In contrast, the UDP-sugars predominated in the uracil nucleotides, which decreased before spawning time. This decrease is apparently associated with the deterioration of polysaccharide synthesis. [3 figures, 2 tables, 9 references]

LB

9.12 (0.38) PANCREATIC ENZYMES OF THE AFRICAN LUNGFISH PROTOPTERUS AETHIOPICUS

Reeck, Gerald R., William P. Winter, and Hans Neurath (Department of Biochemistry, University of Washington, Seattle 98105)
Biochemistry 9, No. 6, 1398-1403 (March 17, 1970)

This article reports on the pancreatic enzymes of the African lungfish in continuation of the authors' interest in the alteration of protein structure in the course of evolution. The lungfish are a group of air-breathing fish found in swampy waters of Africa, South America, and Australia. The lungfish are carnivores and possess functional gills and lungs. The lungfish represent a later stage of development than the dogfish, and both are prime examples of evolutionary constancy. Extensive investigations of the pancreatic enzymes of the spiny Pacific dogfish were conducted earlier by Prahl and Neurath (1966) and Lacko and Neurath (1967). The present article describes the chromatographic separation and identification of the major enzymes, and their respective zymogens, of the pancreas of the lungfish from Africa (Uganda).

The researchers found in the African lungfish all the pancreatic hydrolases known to occur in other vertebrates. The proteolytic enzymes are present as zymogens, including three trypsinogens, two procarboxypeptidases A, and procarboxypeptidase B. Also three (possibly four) chymotrypsinogens are present. Two amylases, two ribonucleases, deoxyribonuclease, and trypsin inhibitor were identified. Lipase activity was present only in preparations not treated with diisopropyl phosphorofluoridate. The authors point out that the strongly anionic character of the trypsinogens at pH 8.0 and the apparently monomeric state of the procarboxypeptidase A are of particular interest.
[4 figures, 20 references]

FTP

9.13

III. ISOLATION AND IDENTIFICATION OF A CONJUGATED PCP YIELDED BY A SHELL-FISH, TAPES PHILIPPINARUM, pp. 103-108.

That phenolic compounds can be detoxified in mammals by conjugation with either glucuronic or sulfuric acid is well known. In 1969, Tadai et al. reported that part of the PCP administered orally to rabbits can be recovered from the urine as the glucuronide. The mode of detoxication of PCP in aquatic organnisms, however, has not been studied. In Part II of the present study, the authors found that PCP-Na dissolved in sea water was rapidly changed to a bound form by Tapes philippinarum. In the part reported here, they deal with the isolation and identification of the conjugated ^{14}C-labeled PCP-Na that is biosynthesized by this shellfish.

A PCP conjugate was isolated by adsorbing the shellfish culture medium on an activated charcoal column, eluting the column with ammonia-acetone, concentrating the eluate under reduced pressure, and subjecting it to silica-gel thin-layer chromatography. The behavior of the isolated conjugate in the chromatograms and during extraction with xylene was identical to that of synthesized PCP sulfate. Since the molar ratio of PCP to SO_4 was almost 1, the authors assume that the isolated PCP conjugate is a sulfate ester of PCP. From these results, they conclude that PCP can be largely detoxified in T. philippinarum by conjugation with sulfate. [5 figures, 3 tables, 11 references]

9.13 (8.59) ROLE OF THE LIVER IN CHOLESTEROL METABOLISM IN FISH AND AMPHIBIANS

Polosukhina, T. Ya., E. A. Portugal'skaya, and Kh. Sh. Kuzhantaeva (Med. Inst., Alma-Ata, U.S.S.R.)
Chemical Abstracts 72, No. 13, 64034h (March 30, 1970)

9.13

required considerably more trials than did the untreated controls. After 3 to 4 weeks of the initial testing, the DDT effect on the trout had disappeared. It appears likely that the DDT acted upon the central nervous system structures of the trout. The authors comment that perhaps, as suggested by Macek (1968), no-effect levels rather than no-kill levels should serve as the basis for establishing water quality criteria. [2 figures, 9 references]

9.14 PRIMARY PRODUCTIVITY AND FISH YIELD

Lin, Yao-sung (Limnological Laboratory, National Taiwan University)
Reports of Fish Culture Research Supported by Rockefeller Foundation, Chinese-American Joint Commission on Rural Reconstruction Fisheries Series, No. 9, 58-69 (February 1970) (In Chinese; English summary)

Attempts were made to determine the relation between mineral nutrients, primary productivity, and fish yield for four fish ponds at the Chupei Fish Culture Station. Among the findings was the fact that the pond with the highest yield had the lowest concentration of Ca^{++}, Mg^{++}, Na^{+}, and K^{+}; the lowest alkalinity value; the highest maximum value for chlorophyll *a* but the second lowest average chlorophyll *a* concentration and the second lowest average value for gross primary production. The author believes that more data are needed for an adequate interpretation of these relations. [3 figures, 10 tables, 26 references]

LB

9.14 STUDIES ON THE EFFICIENCY OF FOOD CONVERSION TO FISH BODY GROWTH.

Yoshida, Yoichi (Dept. Fish., Fac. Agr., Kyoto Univ., Maizuru, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 2 (February 1970)
(In Japanese; figures, tables, and summaries in English)

I. THE FORMULAE ON THE EFFICIENCY OF CONVERSION, pp. 156-159.

In examining the relation between the efficiency of food conversion and the growth of fish, the author arrived at the following formulas:

$$X = \beta/\delta\beta' - \gamma/\delta\beta' W^{1/3}$$

and $$Y = \beta/\delta\beta'Z - \gamma/\delta$$

where X is the efficiency of food conversion; W is body weight; Y is the rate of increase in body weight; Z is the rate of food intake; δ, a constant, is the energy per unit weight used during formation of the increased body parts; and β, β', and γ are constants. [4 figures, 6 references]

II. THE APPLICATION OF THE FORMULAE TO THE EFFICIENCY OF CONVERSION IN BREEDING FISHES, pp. 160-164.

During attempts to apply these formulas, the author realized that they were applicable only if breeding conditions and growth stages were constant. Therefore he modified the formulas as follows to provide for different growth stages:

$$X = \beta/\delta\beta' - \gamma/\delta\beta' W^{n-m} \text{ and } Y = \beta/\delta\beta'Z - \gamma/\delta W^{n-1}$$

The terms apply to the same values as before; m and n are also constants.
[3 figures, 2 tables, 8 references]

9.14 CULTURE OF FISH FOOD ORGANISMS

Anonymous
FAO Fish Culture Bulletin 2, No. 2, 6 (January 1970)

To meet the need for live food for grey mullets raised under experimental conditions, a controlled system for the culture of chironomid larvae has been developed at the Dor Fish Culture Research Station, Israel. Circular asbestos pans of 1-m diameter filled with a 4 to 5-cm layer of soil, and provided with a slow flow of water have been found very suitable for their culture.

During cold and windy weather, the pans are protected by mats or plastic covers. Chicken manure, fish meal or other similar organic matter is added in small quantities periodically to fertilize the pans. One square metre of pan area yields about 300 g of chironomid larvae per week.
[1 photograph]

9.16 FROG CULTURE -- A NEW LOOK AT AN OLD PROBLEM
(1.93)

Culley, Dudley D., and Claude T. Gravois (Department of Forestry and Wildlife Management, Louisiana State University, Baton Rouge)
American Fish Farmer 1, No. 5, 5-10 (April 1970)

Apparently a complete method for bullfrog culture is not yet available, but results of research studies at Louisiana State University (LSU) indicate that frog culture on a large scale may be feasible within a few years. Results of studies at LSU to date indicate that: (1) Bullfrogs (Rana catesbeiana) grow well in cages if the environment is kept clean and plenty of food is provided. (2) Survival of bullfrogs raised indoors is 98 percent or higher. (3) Those frogs that grow relatively rapidly reach marketable size (8 inches in length or about 130 grams in weight) 8 months after metamorphosis (change from tadpole to newly formed frog). Most bullfrogs are of marketable size by the end of 12 months. (4) Food conversion for bullfrogs reared to three-fourths of marketable size is about 2.5 on a wet weight basis and 0.5 on a dry weight basis. The food conversion varies from 1.9 to 3.8 when the ambient temperature is maintained at about 75° F. and disturbances are kept at a minimum. But, when the temperature drops below 70° F. and if the frogs are disturbed excessively, the food conversion increases to 5.0 and higher. (5) Present cages are designed to house 200 to 300 frogs. The design of rearing facilities, however, is still in the development stage; improvements are needed in the present cages to facilitate handling of frogs and to reduce labor

(over)

9.16 OCEAN DEVELOPMENTS
(1.12)

Anonymous
East 6, No. 2, 64 (March-April 1970) (The East Publications New York Office, P.O. Box 948, Radio City Station, New York, N.Y. 10019)

A single tuna spawns an average of 5,000,000 eggs; a salmon or trout spawns an average of 2,500. Up to now, artificial propagation of tuna has been considered well nigh impossible for two reasons: (1) mature male and female tuna are very hard to catch at the same time, and (2) a feed suitable for newly hatched tuna fry has not been available. Prof. Motoo Inoue of Tokai University, Tokyo, Japan, has proposed a plan for solving both these problems.

Using the sperm of mackerel (which belongs to the same biological class as tuna) for test purposes, Prof. Inoue has successfully frozen these reproductive cells for long-term preservation. The plan is to catch female tuna in the ocean and artificially fertilize them on board ship with the preserved sperm. The females will be kept in fish farms in the South Seas till they spawn. When the fry reach 20 or 25 centimeters in length and are strong enough to escape predators, they will be released into the ocean to move, as they develop, with the Black Current toward the coast of Japan. Thus Japanese tuna fishermen will have easier access to the resource. Such a plan, of course, will require that some international control system be set up under which beneficiaries (Korea, Taiwan, and the United States) join Japan in cultivating this ocean resource.

In solving the feed problem, Prof. Inoue devised a method for adapting to sea water a fresh-water chlorella that is palatable to the copepods upon which tuna fry live. Thus the shortage of plankton that so hampers the growth of young tuna in the ocean will be relieved. [1 figure]

9.1 (1.85)

PROCEEDINGS OF THE WORLD SCIENTIFIC CONFERENCE ON THE BIOLOGY AND CULTURE OF SHRIMPS AND PRAWNS

Mistakidis, M. N. (Marine Biology and Environment Branch, Fishery Resources and Exploitation Division, FAO) (editor)
FAO Fisheries Reports No. 57, vol. 3, pp. 589-1165 (October 1969). FRm/R57.3 (Tri)

This report (volume 3) contains the last of the experience papers presented to the World Scientific Conference held in Mexico City, Mexico, on June 12-21, 1967. The first volume contains the Report of the Scientific Conference. The second volume contains the review, regional summary, and some experience papers. The last volume (4) will contain the species synopsis papers.

Volume 3 contains 41 papers on the stated subject. The abstracts are in English, French, and Spanish. Thirty-five papers are in English, six in Spanish, and one in French. The report has been distributed to the FAO regional officers, FAO member and associate member nations, participants and contributors, and concerned international and intergovernmental agencies. FTP

9.19 (0.6)(9.6)

CHEMISTRY AND TOXICOLOGY OF AGRICULTURAL CHEMICALS. A FOUR-YEAR SUMMARY REPORT, 1965 THROUGH 1968.

Food Protection and Toxicology Center, University of California, Davis, California (December 1968), 212 pp. (Price not given)
Reviewed by Manfred Kroger
Food Technology 24, No. 5, 42 (May 1970)

The report discusses in detail the history and past progress of the Food Protection and Toxicology Center. The report discusses 57 research projects and is divided into four sections: (1) Analytical Methods and Instrumentation, (2) Biological Methods for Toxicity Measurement, (3) Biological Manifestation of Toxicity, and (4) Environmental Fate of Pesticides and Their Effects. FTP

9.14 (1.92)

THE EFFECT OF PHOSPHORUS AND NITROGEN FERTILIZERS ON FISH PRODUCTION IN FRESHWATER PONDS

Lin, Yao-sung (National Taiwan University)
Reports of Fish Culture Research Supported by Rockefeller Foundation, Chinese-American Joint Commission on Rural Reconstruction, Fisheries Series, No. 9, 54-57 (February 1970) (In Chinese; English summary)

Experiments were conducted to find out whether the production of Chinese carp could be increased (1) by intensifying the dosages of superphosphate or (2) by adding nitrogen fertilizers to the ponds. The results show that phosphorus fertilizer appreciably improves production, especially of silver carp. At a rate of 2,000 kg./ha., $CaH_4(PO_4)_2$ gave the best results; $(NH_4)_2SO_4$ had no effect. LB
[4 tables, 5 references]

9.16 (1.85)

THE LABORATORY CULTURE OF THE PRAWN, PALAEMON SERRATUS

Reeve, M. R.
Fishery Investigations Series II, 26 (1), 38 pp. (1969). Published by H.M. Stationery Office, 49 High Holborn, London, W.C.1, England. Price 15s6d.
FAO Fish Culture Bulletin 2, No. 2, 22 (January 1970)

The booklet describes the experiments in the culture of Palaemon serratus at the Fisheries Experiment Station, Conway, North Wales, United Kingdom. FTP

[8 figures, 3 references] LB

Penaeus monodon, a large, commercially important prawn, is cultivated along with milkfish (Chanos chanos) in ponds. For stocking purposes, the larvae are collected from river mouths and estuaries and reared in small nursery ponds. The study reported here was undertaken to learn the best means of propagating the prawn artificially so that prawn raisers will not be dependent on natural stocks. The characteristics and behavior of young prawns, from egg to the twentieth post-larval stage, are described, and the diets fed are mentioned.

9.16

SUMMARY OF A PRELIMINARY REPORT ON ARTIFICIAL PROPAGATION OF PENAEUS MONODON FABRICIUS (1.85)

Liao, I-chiu (Rockefeller Foundation Fish Culture Research Program), Ting-lang Huang (Taiwan Fish Culture Station), and Kunio Katsutani (Taiwan Fisheries Research Institute)
Reports of Fish Culture Research Supported by Rockefeller Foundation, Chinese-American Joint Commission on Rural Reconstruction, Fisheries Series, No. 8, 67-71 (December 1969) (In Chinese; figures and summary in English)

9.15

CONTROL OF CHIRONOMID LARVAE IN MILKFISH PONDS WITH ABATE 50% E.C.

Tsai, S. C. (Rockefeller Foundation Fish Culture Research Program), and T. L. Huang (Taiwan Fisheries Research Institute)
Reports of Fish Culture Research Supported by Rockefeller Foundation, Chinese-American Joint Commission on Rural Reconstruction, Fisheries Series, No. 8, 118-122 (December 1969) (In Chinese; tables and summary in English)

Abate 50% E.C. (0,0,0',0'-tetramethyl 0,0'-thiodi-p-phenylene phosphorothioate), when diluted 2,000 times with water and applied to milkfish ponds in an amount to make a concentration of 0.05 p.p.m., will kill all chironomid larvae within a radius of 10 m. without adversely affecting the milkfish or the bottom algae. The author therefore suggests that this pesticide be used instead of Sumithion (O,O-dimethyl O-(3-methyl 4-nitrophenyl) phosphorothioate) or Lebaycid (O,O-dimethyl O-(4-methylmercapto-3-methylphenyl) thionophosphate) to control chironomid larvae in milkfish ponds. Tables are given showing the toxicity of Abate 50% E.C. under different water, dosage, and application conditions to chironomid larvae; of Abate 50% E.C. and Abate 1% granule on the algae in the pond; of Abate 50% E.C. on 13 species of fish and shellfish; and, comparatively, of Abate 50% E.C. and 1% granule, Lebaycid 50% E.C., and Sumithion 50% E.C. to milkfish and chironomidae. LB
[6 tables, 7 references]

9.14 (1.92)

CARP FEEDING WITH DRY FOOD WITH DIFFERENT PROTEIN CONTENT

Steffens, Werner (Deut. Akad. Landwirtschaftswiss., Berlin, Germany)
Chemical Abstracts 72, No. 15, 76335v (April 13, 1970)

9.16 STUDIES ON WATER CONTROL BY FILTRATION THROUGH SAND BED IN A MARINE AQUARIUM WITH CLOSED CIRCULATING SYSTEM. VI. ACIDIFICATION OF AQUARIUM WATER

Hirayama, Kazutsugu (Faculty of Fisheries, Nagasaki University, Nagasaki, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 1, 26-34 (January 1970)

Despite the many studies that have been made on aquariums with closed circulating systems, the relation of the acidifying velocity of the water to the weight of feed per day and to the body weight of the fish grown in the aquariums has largely gone unexplored--as have the changes in chemical composition of the water following acidification. Since the physiological effects of these changes govern the health of the fish being cultured, the author undertook to clarify and solve the problems they pose. Using experimental aquariums made of vinyl chloride plate, he studied the effect on acidification of three types of filter sand, of black sea bream (Mylio macrophalus) fed with shrimp, and of "ishidai" (Oplegnathus fasciatus, a percoid fish) fed with fish.

The study showed that the acidifying velocity (V, eq./day) of aquarium water is not affected by the grain-size of the filter sand. The relation between V and the feeding rate (F, g./day) can be expressed by the equation $V = 0.92\ F \times 10^{-3}$. In contrast with the effect of F on V, the variations in the body weight of the fish have a negligible effect. Since accumulation of ammonium-N and decrease of V are not noticeable at pH values of less than 7.0, the author assumed that the

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9.16 (9.19)(9.6) LIMNOLOGY AND PRODUCTIVITY

Tack, Peter I. (Department of Fisheries and Wildlife, Michigan State University, East Lansing)
Reservoir Fishery Resources Symposium. Athens, Ga., 1967. American Fisheries Society, Washington, D.C. (1969), viii + 570 pp. $10.
Science 168, No. 3930, 436 (April 24, 1970)

This symposium consists of 38 papers plus the welcoming address and the summary. Most of the papers are concerned with the physical and chemical limnology and the production ecology of reservoirs, which at the time of the symposium covered nearly 9,000,000 acres in the United States. A substantial part of the book is devoted to water quality--how to predict it before the water is impounded and how to control it after impoundment. Among the papers in this part are one on the mechanics of stratified flows, by Wunderlich and Elder, and one on the modification of water quality by destratification, by Irwin, Symons, and Robeck; nearly all deal with water quality as a determinant of fish or fish-food production. Another important part of the book is devoted to fish population and the interactions of predators and nonpredators.

Despite its shortcomings--the lack of analytical and evaluative definition and the absence of answers to many of the nagging problems associated with fish production and to such questions as how and by whom the efforts of diverse user groups will be integrated for optimum development of reservoir management--the reviewer considers the book a useful reference. [illustrations]

9.16 ARTIFICIAL PROPAGATION OF GREY MULLET, MUGIL CEPHALUS LINNAEUS

Liao, I-chiu, and C. P. Hung (The Rockefeller Foundation Fish Culture Research Project in Taiwan), M. C. Lin and Y. W. Hou (Taiwan Fisheries Bureau), T. L. Huang (Taiwan Fisheries Research Institute), and I. H. Tung (Institute of Fishery Biology, National Taiwan University)
Reports of Fish Culture Research Supported by Rockefeller Foundation, Chinese-American Joint Commission on Rural Reconstruction, Fisheries Series, No. 8, 10-20 (December 1969) (In Chinese; figures, tables, and summary in English)

The gray mullet constitutes one of Taiwan's most important commercial fisheries--the roe taken from migrating spawners are dried and exported, and 2- to 3-cm.-long fingerlings caught in river mouths and estuaries are the basis of a profitable fish-farming system. Because the natural supply of these fingerlings is so unpredictable, the 6 or 7 million required by the fish farmers cannot be obtained with the regularity and continuity needed to sustain an economic operation. For the past 5 years, the authors' agencies have been trying to propagate mullet artificially in an effort to alleviate the situation. Up to now they have failed. The difficulty lies principally in rearing the fry. This report is an account of still another effort in the direction of that goal.

Of 30 spawners, the eggs of only 3 were successfully fertilized and hatched. At a salinity of from 32.4 to 32.7‰ and a water temperature of 21° C., the fertilized eggs hatched in from 60 to 65 hr.; when the water temperature was raised to 24° C., hatching time was reduced to between 44 and 50 hr. The larvae could

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9.19 ENVIRONMENTAL SURVEILLANCE AROUND A NUCLEAR FUEL REPROCESSING INSTALLATION, 1965-1967

Kelleher, W. J. (Bureau of Radiological Health, Department of Health, Albany, New York)
Radiological Health Data and Reports 10, No. 8, 329-339 (1969)

Data are given to show the levels of radioactivity of air, milk, liquid wastes, watersheds, silt, deer, and fish in the areas surrounding a nuclear fuel reprocessing plant that began operating in the spring of 1966. The levels of ^{131}I, ^{137}Cs, and ^{90}Sr in milk did not change detectably during the 3-yr. test period. However, the levels of ^{137}Cs in the soft tissues of deer and of ^{90}Sr in fish increased significantly.

The author suggests that the changes in the soft tissues of the deer were probably due to the deer's drinking contaminated water. He also suggests that the high levels of radionuclides in the deer and the fish may be enough to cause health hazards. [9 references]

9.16

not tolerate a salinity lower than 17‰ , nor did they seem to adapt to frequent changes of salinity. The larvae survived for only 9 days in running water, but in still salt water that was gradually diluted with brackish pond water, two of the fry lived for 30 days and attained a length of 1.0 and 1.1 cm.
[10 figures, 3 tables, 8 references]

9.19 APPLICATION OF IONIZING RADIATION TO THE TREATMENT OF WASTE WATERS AND SEWAGE SLUDGE

Compton, D. M. J., Sandra J. Black, F. L. Lieurance, and W. L. Whittemore (Gulf General Atomic Inc., San Diego, California)
From Symposium on Utilization of Large Radiation Sources and Accelerators in Industrial Processing, Munich, Germany, 18-22 August 1969.
Available from the Clearinghouse for Federal Scientific and Technical Information, U.S. Department of Commerce, Springfield, Va. 22151.
Nuclear Science Abstracts 24, No. 6, 990 (March 31, 1970)

The authors concluded that irradiation is not an economical competitive process for oxidation of organic impurities in waste waters nor as a conditioning agent in sludge filtration. They found, however, that irradiation does produce potentially useful effects in enhancing the setting of sludge, and they are doing further work along this line.
FTP

9.19 RHEINWERFT'S ANSWER TO OIL POLLUTION

Becker, Alfred (Rheinwerft Shipyard, Mainz-Wombach, Germany)
Dock and Harbour Authority 50, No. 587, 200-202 (September 1969) (Proxlow Publications, Ltd., 19 Harcourt Street, London, W.1, England)

The "Rheinwerft Oil Removal Unit" has proved successful in eliminating oil slicks in confined waters. The device, basically, consists of three circular pontoons disposed and strutted triangularly. Inside the triangle is a floating basin in which the water level is lowered with a pump. The pump is housed on one of the pontoons. The floating oil flows into the artificial well so created. A second pump located on another pontoon draws off the oil from the artificial well.
[4 illustrations]
FTP

9.19 PETROLEUM LUMPS ON THE SURFACE OF THE SEA

Horn, Michael H., John M. Teal, and Richard H. Backus (Woods Hole Oceanographic Institute, Woods Hole, Massachusetts 02543)
Science 168, No. 3928, 245-246 (April 10, 1970)

At least 75 percent of the 734 neuston tows made during cruise 49 of the R.V. Atlantis II (from Rhodes to São Miguel) between 10 May and 28 June 1969 contained tarry lumps ranging in size from 1 or 2 mm. to about 10 cm. Analysis revealed that the tar was soluble in chloroform and chromatographically like crude oil. Since the low-boiling fraction of the oil--that is, the fraction that contains the most immediately toxic substances--was retained in the lumps, the authors concluded that the formation of lumps tends to conserve the petroleum's poisons.

Several marine organisms were associated with the lumps. Idotea metallica, a pelagic isopod ranging in length from 10 to 25 mm., clung to them. Lepas pectinata, a goose barnacle, was often attached; at one station, 150 barnacles ranging in length from 2 to 8 mm. were attached to four lumps that displaced 40 ml. Since the growth rate of barnacles living on tar lumps is about 1 mm. a week, the authors inferred that the barnacles were about 2 months old and that the lumps were at least as old. A grayish film, presumably composed mostly of bacteria, covered the lumps; it consumed oxygen at about 4 $mm.^3/hr./cm.^2$ of tar surface. Of 10 sauries (Scomberesox saurus) caught in the western Mediterranean and ranging in standard length from 164 to 255 mm., the stomachs of three contained large amounts of tar. Bigelow et al. (1953) reported that all the larger predaceous fishes feed on saury; thus the ingestion of tar by these epipelagic fish introduces a toxic material directly into the marine food chain.
[1 figure, 8 references]
LB

9.16

nitrifying ability of the filter is enough to keep ammonium-N at a low level, even when the pH and the alkalinity are markedly low. Nitrification never stops completely, even when acidification stops at pH values of less than 4.8 and at an alkalinity value of almost 0 meq./liter. (Natural sea water has an alkalinity of about 2.0 meq./l.) Low pH and alkalinity values cause little harm to the fish; even when the pH reached 5.7 and the alkalinity 0.03 meq./l., ammonium-N at about 67 p.p.m. had no apparent effect on the fish.

The author was able to maintain the pH of the water at 7.5 and the alkalinity at 1.0 meq./l. by using crushed coral in the filter. He states emphatically that the prevention of acidification was due to the dissolution of calcium from the coral. Following up on this finding, he soaked concrete blocks in a fresh-water pond for 2 weeks and examined the preventive effect on acidification of the calcium released by the concrete. In spite of the abundant dissolution of calcium, the preventive effect was not at all what he had expected. Nevertheless, knowing the relation of the acidifying velocity to the feeding rate, as determined during these studies, enables him to estimate the weight of lime required to neutralize sea water before it is added to the aquariums.
[7 figures, 1 table, 6 references]

9.16 (1.81) BIOLOGICAL STUDY OF OYSTER CULTURE IN CHIAYI

Lin, Yao-sung (Rockefeller Foundation Fish Culture Research Program)
Reports of Fish Culture Research Supported by Rockefeller Foundation, Chinese-American Joint Commission on Rural Reconstruction, Fisheries Series, No. 8, 77-115 (December 1969) (In Chinese; English summary)

The critical temperature for oyster spawning is 20° C. in Japan and the United States; it is somewhere between 16° and 20° C. in the Chiayi area. Despite the difference, the observations reported in this master's thesis are broad enough to be generally relevant. Among the topics discussed are gonad and shell development, optimum conditions for seed collection and oyster marketing, methods of spat culture, physical effects of spawning, and reasons for oyster mortality.
[8 figures, 36 tables, 96 references]
LB

9.16 DOUBLE WALLED CAGES FOR REARING CARP IN THE COOLING WATER OF POWER PLANTS

Scaffens, Werner, Marie L. Albrecht, Detlev Bartelmes, Hugo Kulow, Ulrich Lieder, Hans U. Menzel, and Guenter Predel (Deut. Akad. Landwirtschaftswiss., Berlin, Germany)
Chemical Abstracts 72, No. 17, 87556n (April 27, 1970)

9.2 ECONOMIC ANALYSIS OF THE COMMERCIAL FISHERY INDUSTRY OF GEORGIA
(1.0116)

Carley, D. H. (University of Georgia, College of Agriculture Experiment Stations, Georgia Station, Experiment, Georgia)
Research Bulletin 37, Georgia Game and Fish Commission and U.S. Department of the Interior, Fish and Wildlife Service, Bureau of Commercial Fisheries, in Cooperation with University of Georgia, College of Agriculture Experiment Stations (June 1968), 92 pp.

Data on the Georgia commercial fishery industry were inadequate to fully evaluate its economic significance in the State. In order to develop a more effective research and development program for the industry, an economic study was undertaken to determine the structure and economic importance of the various segments of the commercial fishery industry in Georgia; to estimate the various inputs of capital, labor, and management relative to expected returns; and to estimate the value added at the various stages of the marketing channel. The value and trends of the production (fishing) and processing segments of the Georgia fishing industry were compared with those of the other South Atlantic states and of the United States as a whole, and with other industries' in Georgia. Considerable effort was placed on analyzing all phases of the shrimp fishery, which dominates both the fishing and processing segments of the Georgia fishery industry. The hard blue crab fishery, the second most important in Georgia, was also analyzed in some detail.

(over)

D. R. Alexander

9.2 AN ANALYSIS OF CONSUMER PURCHASES OF SEAFOOD IN THE SPRINGFIELD, MASSACHUSETTS METROPOLITAN AREA

Gaede, Harold W., Jr., and David A. Storey (Department of Agricultural and Food Economics, University of Massachusetts)
Bulletin No. 579, Agricultural Experiment Station, University of Massachusetts, Amherst (October 1969), 27 pp.

Data collected by personal interview from 402 randomly selected households in the Springfield-Chicopee-Holyoke Standard Metropolitan Statistical Area in Massachusetts are used to determine how often different types of seafood are purchased and to study the relation of household characteristics to different seafood-purchasing patterns. It was found that 94 percent of the surveyed households purchased seafood at least once a year, and 76 percent purchased some type of seafood at least once a week. Canned seafood was purchased by 88 percent of the households, fresh by 78 percent, and frozen by 51 percent. Sport fishing provided some fish meals in 23 percent of the surveyed households. Shellfish items--such as lobster, clams, shrimp, and scallops--were ordered more frequently than fish items in restaurants.

This study indicated that in the year after the Roman Catholic Church rulings which abolished obligatory meatless Fridays, 21 percent of the Catholic households in the Springfield area reduced their seafood consumption, with a total indicated decrease in consumption in the entire metropolitan area of about 6 percent. [14 tables, 17 references]

D. R. Alexander

9.2 IMPROVING THE SUCCESS RATIO IN NEW PRODUCTS

Angelus, Theodore L. (New Products Action Team, Inc., 137 E.36th Street, New York 10016)
Food Technology 24, No. 4, 29, 30, 32-33 (April 1970)

In 1968, 10,000 supermarket items were introduced and about 8,000 failed. The author estimates that during the decade beginning in 1970 over 120,000 new products will be introduced and about 100,000 will fail. The cost of waste on these products will amount to $5 billion on regional test market items and $7 billion on nationally introduced items. A modest introduction of a product on a regional basis may show a cost of failure of $100,000; a nationally introduced product that fails may cost up to $20 million. To determine why new products fail the author analyzed 75 failures of important brands in the food and drug field. On the basis of this analysis, he suggests methods of reducing the waste in new product development and marketing.

The reasons for failure of the various new food and drug products were: (1) Vague Consumer Difference (The difference between the new product and the regular product was insignificant.)--36 percent; (2) Poor Product Positioning (This means that the new product difference is not real to the consumer, the product difference is confusing to the consumer, or the product performance does not match consumer appeal.)--32 percent; (3) No Point of Difference--20 percent; (4) Bad Timing--16 percent; (5) Poor Performance of New Product--12 percent; and (6) Wrong Market for the Company--8 percent. (The total percentage is more than 100 because certain products failed for more than one reason.)

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FTP

9.4 HOW MUCH FOOD FROM THE SEA?

Science 168, No. 3930, 503-505 (April 24, 1970)

[Technical comment No. 1] Alverson, D. L. (Bureau of Commercial Fisheries, Seattle, Washington 98102), A. R. Longhurst (Fishery-Oceanographic Center, Bureau of Commercial Fisheries, La Jolla, California), and J. A. Gulland (Fish Stock Evaluation Branch, United Nations Food and Agriculture Organization, Rome, Italy); pp. 503-505.

In "Photosynthesis and Fish Production in the Sea" (Science 166, No. 3901, 72-76, October 3, 1969), Ryther estimates the potential annual harvest of fish to be about 100,000,000 tons. The authors of this technical comment challenge the estimate, the technique by which it was made (including the parameters used, the calculations, and the corroborating references) and the conclusions it led the author to draw. In particular they question his conclusion about the future capacity of the fishing industry to expand. [12 references]

[Technical comment No. 2] Ryther, John H. (Woods Hole Oceanographic Institution, Woods Hole, Massachusetts 02543); p. 505.

In his answering comment, the author asserts that his estimate and conclusions are not fundamentally different from those published by the challenging authors, their organizations, and the authorities they cite, and that his references, when taken in context, are indeed corroborative. He points out that his

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9.2

The author makes the following suggestions for reducing the cost of waste in the development and marketing of new products and for improving the chances of success: (1) distinguish between marketing opportunities and new product opportunities, (2) create full new brand concepts, (3) restructure and restaff new product department; (4) establish improved creative interpretation of market research, and (5) demand new approaches by advertising agencies.

9.4

REPORT OF THE BUREAU OF COMMERCIAL FISHERIES FOR THE CALENDAR YEAR 1968

United States Department of the Interior, U.S. Fish and Wildlife Service, Bureau of Commercial Fisheries, Printed by the United States Government Printing Office, Washington, D.C. (1970), 140 pp.

The many and varied activities of the Department of the Interior's Bureau of Commercial Fisheries to conserve the Nation's food fishes are summarized in this annual report.

These activities include basic research to gain knowledge of the fish we harvest and their environment so that we may use them wisely for the benefit of our people.

The Bureau also seeks ways to make better use of the fish once they are harvested, by improving methods of processing and marketing.

And it administers a loans-and-grants program to give direct economic assistance to fishermen, as well as a financial aid program that assists State fish and game agencies in their administration of commercial fisheries.

Foreword reprinted in part

9.4

contribution to originality lies in his breakdown of the potential fish yield into ocean provinces and in his thesis that most of the ocean is biologically impoverished--not in his estimate of the amount of fish the oceans may yield. [4 references]

9.2

Shrimp and blue crab account for over 90 percent of the quantity and value of all species landed. Processed shrimp products account for about 70 percent of the value of all fishery products manufactured in Georgia. Breaded shrimp is the most important product. In terms of total U.S. production, about 20 percent of the breaded shrimp and 15 percent of the peeled and deveined shrimp were processed in Georgia during the 1960's.

Since 1960 the trend in the annual landings of shrimp has been downward. However, because of increasing prices for shrimp, the total value has shown a slight upward trend. The problems of fluctuating abundance and seasonality make it difficult for owners and crews of vessels to make decisions regarding adjustments in fishing operations for the most profitable outcome. The number of vessels licensed to fish in Georgia waters during the 1956-66 period ranged from 284 to 363, averaging 322. Information on gross income and cost of operations was obtained for a sample of 50 vessels. Gross income per vessel averaged $20,125. Fixed costs increased at an increasing rate with an increase in the size of the vessel; and, although the average vessel size has been increasing, the quantity of shrimp landed per vessel has not shown an appreciable upward trend.

Primary wholesalers of shrimp sold more than one-half of the shrimp handled to processors. Almost three-fourths of the first sale of shrimp was to Georgia destinations.

Problems associated with the fishery industry in Georgia, as stated by industry representatives, include: (1) scarcity of skilled labor; (2) pollution, and control measures for limiting pollution; and (3) apparent differences in some of the laws controlling fishing areas and open seasons among geographic areas. [24 figures, 29 tables, one appendix]

9.2

"FORM"ALIZED APPROACH TO GO OR NO-GO DECISIONS --- USING DECISION GUIDES FOR RESEARCH AND DEVELOPMENT

Goodman, Sam R. (Nestle Company, Inc., White Plains, New York 10605) Food Technology 24, No. 4, 42, 52-53, 57 (April 1970)

New products fail for many reasons at various stages of development and marketing. One important stage of failure occurs at the laboratory level. Food technologists can increase their efficiency and gain a greater appreciation of the impact of their work by the use of a Decision Guide. The Guide facilitates the evaluation of the various facets of probable profitability, of product life cycle stages, and of the incremental investment required for projects involving new product development. The Guide is reproduced in the article and is taken from the author's forthcoming book, "Techniques of Profitability Analysis," to be published by Wiley-Interscience, John Wiley & Son, Inc., New York, in 1970.

The Decision Guide form encompasses 10 areas: (1) Product Description, (2) Urgency and Risk, (3) Competition, (4) Technical Information, (5) Distribution, (6) Profitability, (7) Life Cycle, (8) Probability of Success, (9) Return on Investment and Payback Period, and (10) Approvals. In this article the author discusses areas 2, 3, 5, 6, 7, and 8.

FTP

9.2
(1.51)(1.52)
(1.69)

AN ANALYSIS OF CONSUMER PURCHASES OF FRESH HADDOCK, FLOUNDER AND COD IN QUINCY, MASS. AND BINGHAMTON, N.Y.

Krebs, Edward H., and David A. Storey (Department of Agricultural and Food Economics, University of Massachusetts) Bulletin No. 579, Agricultural Experiment Station, University of Massachusetts, Amherst (June 1969), 23 pp.

This study was an explanatory attempt to improve the state of knowledge about consumers of haddock, flounder, and cod--the most important species of New England finfish that are marketed as fresh fish. Mail questionnaires were sent to households in Quincy, Massachusetts, and Binghamton, New York, to obtain information about their purchases of these species. The period covered by the study ended in November 1966, just prior to the Bishops' rulings which ended obligatory meatless Fridays for Roman Catholics.

The results indicated that households in Quincy purchased fresh fish considerably more often than Binghamton households did. Haddock was the most important of the three species in both cities, and cod was least important. Income level did not appear to be related to the frequency of purchase in either city. Restaurant purchases were about equal in the two cities. The major explanation for the differences between the two cities appeared to be the fact that the fresh forms of these species of fish were more frequently available in Quincy grocery stores. [11 tables, 16 references]

D. R. Alexander

1.53 (1.0162) AN APPLICATION OF ELECTROPHORETIC ANALYSIS OF MUSCLE MYOGENS TO TAXONOMIC STUDIES IN THE GENUS MERLUCCIUS

Jones, B. W. (Ministry of Agriculture, Fisheries and Food, Fisheries Laboratory, Lowestoft), and I. M. Mackie (Ministry of Technology, Torry Research Station, Aberdeen, Scotland)
Comparative Biochemistry and Physiology 32, No. 2, 267-273 (January 15, 1970)

Franca reported in 1954 that the Southwest African hake fishery comprises more than one species, but the fishing industry is apparently unaware of this fact--certainly no distinction is made between the two main species when the fish are marketed. Using the disk electrophoretic technique, with myogen extracts applied directly to the tops of polyacrylamide gel columns, the authors separated the muscle myogens of hake taken from seven hauls into two groups. The electrophoretic patterns correlated exactly with an independently established morphological division; two species, both of which were clearly different from the European Merluccius merluccius, were present: M. capensis and M. paradoxus. Both species were caught in widely distributed areas, leading the authors to conclude that the latter is more widespread than has previously been reported. There was some evidence that M. paradoxus lives in deeper water than M. capensis does. [1 figure, 3 tables, 13 references] LB

6.32 HALOSPHAERA VIRIDES: FATTY ACID COMPOSITION AND TAXONOMICAL RELATIONSHIPS

Ackman, R. G., R. F. Addison, and S. N. Cooper (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia) and A. Prakash (Fisheries Research Board of Canada, Marine Ecology Laboratory, Bedford Institute, Dartmouth, Nova Scotia)
Journal of the Fisheries Research Board of Canada 27, No. 2, 251-255 (February 1970)

The purpose of this study was to examine the fatty acids of Halosphaera as indicators of taxonomic position. The total fatty acids of H. viridis (a unicellular alga) were determined. The algae contained a readily extractable lipid fraction, mostly triglyceride, that showed additional monoethylenic fatty acid isomers not obvious in the total lipid. The authors discuss the usefulness of the data in distinguishing Chlorophyceae and Prasinophyceae within the Chlorophyta. [1 table, 11 references] FTP

6.37 SEA TANGLE FLAVORING

U.S. Patent 3,481,748
Sazuno, R., and K. Ishida; Kyowa Hakka Kogyo Co., Ltd. (pat.)
Food Technology 24, No. 4, 148 (April 1970)

A flavoring agent is prepared by the chemical solubilization of sea tangle (edible seaweed) FTP

0.2 (2.111) STUDIES ON APPROXIMATE FORMULAS FOR TENSION AND CONFIGURATION OF THE TOWING ROPE

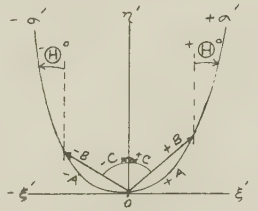
Miyazaki, Yoshio (Tokyo University of Fisheries, Minato-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 1 (January 1970) (In Japanese; figures, tables, and summaries in English)

I. METHOD OF APPROXIMATION, pp. 48-57.

A practical method is given for calculating the tension of towing rope (wire and fiber) and the configuration of plane nets in a stream. Assuming that the shape of a rope or plane net towed at constant speed is catenarian, the author presented formulas with which not only tension and configuration can be calculated but length, trail, or depth, for example, in any part of the material. The calculated values so derived differ from experimental values by about ±10 percent. [12 figures, 22 references]

II. METHOD OF CALCULATION, pp. 58-67.

Calculating the tension of a towed rope or the configuration of a gill net by the voluminous tables of function or by computer is impractical, even if the results are accurate. When only the loop functions of the basic catenary σ', ξ', η' are given, the objective value can be calculated by formulas. However, the calculation process is too complex for practical application. Therefore, the author simplified the process by using the functions A, B, and C. The order of calculation was obtained from examples. [6 figures, 3 tables, 11 references]



Basic catenary and A, B, C functions

LB

9.3 (9.2)(1.30)(9.6) ECONOMISTS ON RESOURCE MANAGEMENT

J. L. McHugh (Office for the International Decade of Ocean Exploration, National Science Foundation, Washington, D.C.) (reviewer)
The Pacific Salmon Fisheries. A Study of Irrational Conservation. Published by the Johns Hopkins Press, Baltimore, Maryland (1969), xii + 220 pp., illustrated. Price $6.00.
Crutchfield, James A., and Guilio Pontecorvo
Science 168, No. 3932, 737-739 (May 8, 1970)

This is a critical review of the thesis and points expressed by the authors of the book regarding management of the American fisheries. The authors' thesis is that "rational fishery management must evolve from the objectives of maximizing the net economic yield of the resource." The reviewer concludes that the book is an important contribution to the theory of fishery management and it is certain to stimulate the biologists and economists to dig even more deeply into the subject. Furthermore, he says that when sociologists begin to take an equal interest in the problems of open access resources and team up with the economists and biologists, the differences between economists and biologists should begin to disappear. FTP

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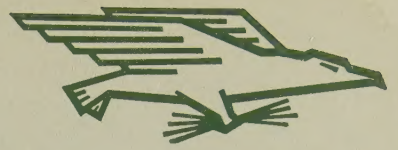

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